

Coping Behaviour and Outcome in Two Pain Populations:  
A General Adult Population with Neck or Low Back Pain &  
Individuals Suffering From Pain Due to Motor-Vehicle Injuries

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## ABSTRACT

The role of coping behaviour in the adjustment of pain sufferers has received much attention in recent years. However, despite the abundance of research, there are still some gaps in the literature. For example, little research has been done to investigate how pain sufferers in the general population or individuals suffering from pain secondary to a motor vehicle collision cope with their pain, and how that affects their outcome. The present studies sought to clarify the role of coping strategies within the pain experience by reviewing the existing literature and addressing some of the gaps. Four separate studies were conducted. Study 1 consisted of a systematic review of the literature on coping with pain. Its purpose was to summarize the scientifically sound information regarding coping with pain. Study 2 consisted of a systematic review of the literature on the risk/prognostic factors for low back pain. Its purpose was to identify valid risk/prognostic factors and use this information to guide the analyses in the empirical studies. Study 3 examined the ability of passive coping strategies to predict the development of disabling neck and/or low back pain in a random sample of the general population who were suffering from non-disabling spinal pain. Study 4 examined the ability of passive coping strategies to predict recovery in a population of individuals suffering from whiplash or low back pain secondary to a motor vehicle collision. The findings show that the current literature on coping with pain highlights the maladaptive nature of passive coping strategies like catastrophizing or allowing the pain to restrict/decrease activities. Studies 3 and 4 further highlight the negative impact of passive coping behaviour, identifying it as an important risk factor for the development of disabling pain and as a prognostic factor for poor recovery from whiplash and low back pain resulting from a motor vehicle collision. These combined

findings point to the need for disseminating information about the maladaptive nature of passive coping strategies and for developing programs that target the decreased use of this response to pain. In addition, it highlights the need for further research that examines the impact of decreasing these passive strategies and identifying coping behaviours and other factors that promote better adjustment.



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## 1. INTRODUCTION

Coping is an important concept in the area of stress and adjustment. Several theoretical approaches have been postulated to define coping and describe its role in the adjustment to stressful situations. Three major theoretical approaches to coping have emerged in the literature and must be considered in order to clarify what is generally meant by “coping”. When the stressor under study is pain, particular attention must be paid to the theoretical approach that views coping as a process. This approach has led to much of the research in the area of coping with pain. It considers the flexible nature of coping behavior, the potential impact of contextual and person-related variables in the choice of coping behavior, and the varying nature of the relationship between coping behavior and outcome. Thus, when the stressor in question is pain, this theoretical approach to coping provides a clear conceptualization of it for the study of the relationship between coping behavior and outcome or recovery.

The literature on coping with pain currently continues to grow. As it becomes more abundant, more is learned about the nature of coping with this particular stressor. However, as the volume of studies grows, it becomes impossible for clinicians and researchers alike to stay aware of the current knowledge. It is also difficult for many stakeholders to assess the quality of the research that is produced. Systematic reviews of the literature are an important method of dealing with the sometimes overwhelming nature of the growing literature and provide clinicians and others with information regarding the results of the scientifically acceptable research. As yet, there have been no structured and comprehensive reviews of the empirical literature on coping with respect to scientific merit. The growing number of studies and increasing interest in the area of coping with pain now merits a scientific review to examine the relationship between coping with pain and outcome. Thus, one of the objectives of the present study was to



conduct a comprehensive and systematic critical review of the literature on coping with pain.

The second main objective of the present study was to assess the relationship between coping behavior and outcome in those with pain, when other confounding factors are considered. Little research has been done on how the general population copes with pain and how this coping affects pain outcome. A related question is how individuals in the general population, who have suffered soft tissue injuries in motor vehicle collisions, cope with pain and what impact that has on recovery. The role of coping in predicting the outcome of the pain experience is an important one that needs to be examined. The present study addressed this gap in the research literature.

### 1.1 Theoretical Approaches to Coping

Over time, there have been varying thoughts on what constitutes coping. Three major theoretical approaches to coping emerge in the literature. The first approach originates in the psychodynamic literature. The second approach views coping as an enduring facet of the individual. The third approach views coping as a process that is flexible and responsive to environmental demands and personal preferences. Each theoretical approach will be briefly discussed to provide an overview of the different conceptualizations of coping and to provide a shared conceptualization of what is meant by “coping”.

#### 1.1.1 Psychodynamic Approach to Coping

The psychodynamic approach to coping focuses primarily on defense mechanisms, which are defined as unconscious means of regulating negative affect (Aldwin & Brustrom, 1997). In this view, coping is referred to as a successful method of adjustment and is contrasted with a lack of coping or a failure to meet the demands of

a stressful situation (Edwards, 1988). Several theorists within this approach have developed hierarchical models to describe coping. For example, Haan (1977, as cited in Aldwin & Brustrom, 1997) developed a hierarchical model that divided the way people deal with stressful events into three modes. He labeled the first mode as “coping” and defined it as the conscious, flexible, and purposeful attempts used by an individual to regulate both the emotions and the environment. The second mode consists of defense mechanisms, which are unconscious, inflexible, and directed primarily at regulating emotions. The third mode of dealing with stressful events is rigid, automatic, and ritualistic. This mode is labeled as fragmentation processes and often constitutes psychotic flight from reality. Haan (1977) felt that people “cope” with less stressful problems, use defense mechanisms when they have to, and fragment under intolerable strain. From this model of the psychodynamic approach to this issue, it is clear that coping represents the highest level of adjustment and that processes lower in the hierarchy represent less reality-oriented methods of adjustment (Edwards, 1988).

Thus, the psychodynamic approach views coping as analogous to adjustment. It refers not only to the method of dealing with the stressful situation but the positive outcome as well. Individuals either cope or they do not. One of the main criticisms against this view of coping is that it confounds coping and outcome (Lazarus & Folkman, 1984). It fails to differentiate between the coping efforts that help the person and those efforts that hurt the person. Instead, it equates adaptational success with coping and labels less successful efforts to deal with stress as defenses. This places a value judgement on specific forms of coping behavior and fails to take contextual variables into account (Lazarus & Folkman, 1984). As such, as a theoretical perspective, it provides little guidance with respect to the study of the relationship

between coping and its outcome. It is, however, superficially consistent with the way the term “coping” is often used in the vernacular. For example, people often use the phrase “I am coping” to mean, “I am doing well under the adverse circumstances”. “He is not coping with the situation” reflects someone whose coping strategies are seen as less than successful. Thus, although the psychodynamic perspective on coping provides little guidance in the study of coping with pain, it is consistent with a conceptualization that is used in everyday conversation.

#### 1.1.2 Coping as an Enduring Facet of the Individual

Some theorists would argue that the use of specific coping strategies reflects a stable and enduring facet of the individual (McCrae & Costa, 1986). According to this view, people have a preferred coping style to deal with stressors. It is suggested that “trait-like individual difference factors predispose people to specific coping behaviors leading to a more or less consistent style of coping” (Houtman, 1990, p.53). Thus, the distinction between personal characteristics, coping styles, and coping behaviors would be one of generality or level of abstraction (Houtman, 1990). This view of coping as a facet of personality suggests that people are predisposed to develop a particular coping style and will employ this coping style whenever they are faced with a stressor.

Generally, this view of coping has been described in terms of a dichotomy. For example, coping styles have been classified as repression vs. sensitization or approach vs. avoidance (Aldwin & Brustrom, 1977). In each case, one side of the dichotomy is usually labeled as the more adaptive mode of coping. Another commonly known example of viewing coping as an enduring style is the “Type A” personality. Individuals who are classified as “Type A” are thought to cope with all aspects of life in a particular

fashion (Lazarus & Folkman, 1984). Thus, this view of coping characterizes it as a fairly consistent way of dealing with stressors.

In this theoretical approach to coping, individuals are thought to be predisposed to develop a particular coping style. This predisposition is linked to certain personality traits (Houtman, 1990). Several studies have investigated the association between coping behavior and personality traits (e.g., Amirkhan, Risinger, & Swickert, 1995; Hart, Turner, & Cardozo, 1987; McCrae & Costa, 1986; Rim, 1987; Rim, 1986). The traits that have most commonly been investigated are extraversion and neuroticism (Amirkhan et al., 1995; McCrae & Costa, 1986; Rim, 1987; Rim, 1986), with Openness to experience (McCrae & Costa, 1986), psychoticism, (Rim, 1986), and optimism (Rim, 1990) also receiving some attention. What these studies have generally suggested is that there is, in fact, some relationship between personality traits and the use of specific coping strategies. People with certain personality traits are more likely to use certain styles of coping. For example, individuals who are high in Extraversion are more likely to use problem-focused coping strategies (Rim, 1986; Rim, 1987) and less likely to use avoidance strategies (Amirkhan et al., 1995, Houtman, 1990). In contrast, individuals high in Neuroticism are less likely to use problem-focused coping (Rim, 1986). The personality characteristic of Neuroticism has been found to be correlated with ineffective coping while Extraversion has been found to be related to effective coping (Houtman, 1990). When people are asked to rate the effectiveness of coping strategies, the strategies that were more often related to Extraversion (e.g., rational action, seeking help, expressing emotion) were ranked as highly effective, while those strategies related to neuroticism (e.g., hostile reactions, indecisiveness, wishful thinking, self-blame) were generally perceived as ineffective (McCrae & Costa, 1986). However, these studies

have also found a wide variability in coping strategies related to each trait under question. Thus, although personality traits may have some role in determining coping style, other factors likely come into play when a person copes with a particular stressor. Rather than a unidimensional and stable characteristic, coping has also been thought of as a multidimensional and dynamic process (Edwards, 1988), at least partially determined by contextual variables.

### 1.1.3 Coping as a Process

The third theoretical approach to coping assumes that coping is flexible, planful, and responsive to both environmental demands and personal preferences (Lazarus & Folkman, 1984). Lazarus and Folkman (1984) define coping as “constantly changing cognitive and behavioral efforts to manage specific external and/or internal demands that are appraised as taxing or exceeding the resources of the person” (p. 141). This definition allows for a changing nature of coping across situations. It also does not confound coping with outcome since it refers to efforts directed towards the management of a stressor without specific assumptions regarding the success or failure of those efforts (Lazarus & Folkman, 1984). These two assumptions regarding the variability in both the use and the efficacy of coping strategies have led researchers subscribing to this theoretical framework of coping to examine situation-specific coping (Aldwin & Brustrom, 1997).

Lazarus and Folkman (1984) make the assumption that coping behavior is derived from how people appraise the particular stressor they experience. The appraisal they make and the coping strategies subsequently used arise from a transaction between the individual's personal resources and environmental demands and resources. Thus, environmental factors, as well as personality factors are thought to play a role in both the

appraisal of the situation and the coping strategies used to manage the situation. Again, researchers using this theoretical approach often categorize coping behavior according to the focus of that behavior. For example, the term “problem-focused coping” has been used to refer to coping behaviors that are directed at altering the situation that is causing distress, while “emotion-focused coping” refers to coping behaviors that are directed at regulating the distress (Folkman & Lazarus, 1988). It has been consistently found that both forms of coping are used to deal with stress (Folkman & Lazarus, 1988).

Holahan, Moos, & Schaefer (1996) describe another model that considers coping to be a process that is influenced by both stable, person-based factors and transitory, situation-based factors. In the integrative framework that they present, two systems are thought to influence the type of life crises and transitions (i.e., stressors) an individual will face. The personal system includes such factors as sociodemographics (e.g., age, gender, marital status, education level, etc.), personality traits (e.g., extraversion, neuroticism, etc.), and personal coping resources (e.g., self-efficacy). The environmental system includes such factors as ongoing life stressors (e.g., chronic physical illness) and social coping resources (e.g., family support). These two systems are thought to be associated with the type of stressors that an individual faces. Consequently, factors related to the stressor itself, along with these two systems, are thought to influence the appraisal of the situation and coping behavior. Coping is then thought to influence the individual’s health and well-being. In addition, reciprocal feedback can occur at each stage. Thus, an individual’s health and well-being can also influence coping behavior directly or indirectly, through its impact on the environmental system, personal system, or life stressors. Similarly, each of the systems and the life

stressor can directly or indirectly, through coping, impact on the health and well-being of the individual.

These are just two examples of models derived from this theoretical approach to coping. It is clear from the discussion that viewing coping as a process allows for the consideration of the various contextual and person-related variables that can impact on the choice of specific coping behaviors. This theoretical approach to coping also allows for the separate consideration of the relationship between coping and subsequent outcome.

This conceptual framework of coping is the one that is most widely accepted by researchers studying coping with the specific stressor of pain. It allows for the various factors that can influence the form of coping displayed by individuals who are dealing with pain. These factors include person-related variables, environmental variables, and variables related to the stressor of pain, itself. This framework also allows for the study of the relationship between coping and outcome.

#### 1.1.4 Summary

Coping has been conceptualized in a variety of ways from differing theoretical viewpoints. The conceptualization of coping as a process is particularly useful when discussing coping in the present study. This view of coping describes it as flexible behavior that can be influenced by several factors and, in turn, can influence outcome factors. As such, it is a useful conceptualization of coping when studying the relationship between coping and outcome in those with pain.

### 1.2 Rationale for the Present Studies

Coping is an important concept in the area of stress and adjustment. Theoretically, it can be viewed as a process that is influenced by both situational and

person-related factors. The specific coping behaviours that an individual uses to deal with a stressor are influenced by these factors. These coping behaviours can also have an impact on how that person adjusts or recovers from the stressor.

#### 1.2.1 Study 1

The literature examining the factors associated with coping with pain continues to grow. However, to date, there have not been any attempts made to systematically review the literature and integrate the results of the empirically sound studies. Thus, one of the objectives of the present study was to conduct a systematic review of the literature on factors associated with the coping strategies individuals use to deal with pain.

#### 1.2.2 Study 2

A second systematic review was conducted on the literature regarding the risk and prognostic factors of low back pain. In order to fully examine the relationship between coping and outcome in low back pain sufferers, it was important to build models that controlled for the confounding effects of risk and prognostic factors. The literature on low back pain is vast and often contradictory. A systematic review of this literature identified potentially important risk/prognostic factors and guided the coping analysis in the empirical portion of this project.

#### 1.2.3 Studies 3 & 4

The relationship between coping with pain and outcome has not been extensively studied. Much of the research in this area has been cross-sectional in nature and has been unable to assess the temporal relationship between coping and outcome. The present study addressed this gap in the literature by examining the relationship between coping and outcome in two pain populations. The first population consisted of individuals in the general population who were experiencing neck or low back pain. The



relationship between coping and the development of pain-related disability was assessed in this population. The second population consisted of individuals who had neck or low back pain resulting from motor-vehicle injuries. In this second population, the relationship between coping and recovery was assessed. The general population and the motor vehicle injured population are two populations that have not been extensively studied with respect to coping with pain.

Individuals in the general population who are experiencing neck or low back pain have not received much attention with respect to their coping behaviours or the impact of those coping strategies on their ability to function. Yet, these individuals likely differ from the oft studied pain clinic population in a variety of ways (Turk & Rudy, 1990). This population of individuals may or may not be seeking treatment for their pain. This pain population encompasses the wide variety of pain experiences and it is of interest how these individuals in the general population cope with their pain and how those coping behaviours impact on their ability to function on a daily basis. The experience of pain has a differential impact on the pain sufferer. Some individuals experience pain and are able to function well, whereas others are disabled by their pain. The third study examined the relationship between coping behaviour and the subsequent development of disabling spinal pain.

Individuals who are experiencing neck or low back pain resulting from motor-vehicle injuries can be viewed as a subset of the general population of pain sufferers described above. Many of those individuals in the general population who experience pain may be experiencing it due to a motor-vehicle injury. This population of pain sufferers, however, is unique in that there is a specific event that results in the experience of pain. Following the injury and the development of pain, these individuals

strive to cope with and recover from their pain. In addition, there are a variety of other factors that are unique to this pain population. For example, unlike many other pain sufferers, these individuals must deal with an insurance system. These unique factors are likely going to contribute to the outcome of these pain sufferers. What role does coping behaviour play in the determination of outcome? This question has not previously been addressed. Thus, the fourth study examined the relationship between coping behaviour and recovery from neck or low back pain resulting from a motor-vehicle injury.

These two pain populations are unique in various ways. The general population of individuals who experience neck or back pain may have developed their pain in a variety of ways, may have been experiencing their pain for varying amounts of time, and not all individuals would have experienced a discrete injury that is responsible for the pain. These individuals are dealing with their pain in different ways, with some individuals experiencing disabling pain while others are able to function well despite the pain. Individuals who have neck or back pain resulting from motor-vehicle injuries can point to a discrete injury and have the similar experience of a motor-vehicle collision. In addition, they have to deal with an insurance system due to their collision and subsequent injuries. These individuals are dealing with their pain in a variety of ways, with some individuals able to recover from their pain while others continue to struggle and suffer. Despite these differences, these two populations are quite similar. Most adults in the general population drive or are passenger in motor vehicles and are, thus, at risk of collision and subsequent injuries. Thus, studying these two pain populations afforded the opportunity to study the relationship between coping behaviour and two opposite forms of outcome, the development of disabling pain and recovery from pain.

### 1.3 Objectives

1. To conduct a systematic review of the literature on coping with pain (Study 1).
2. To conduct a systematic review of the literature on the risk/prognostic factors of low back pain (Study 2).
3. To study the question of whether passive coping is a risk factor for development of disabling pain in individuals in the general population with neck and/or low back pain (Study 3).
4. To study the question of whether passive coping is a prognostic factor for recovery in individuals suffering from whiplash and/or low back pain due to a motor vehicle collision (Study 4).

## **2. STUDY 1: Systematic Review of the Pain Coping Literature**

## 2.1 Introduction

In almost all scientific areas of study, the literature is vast and continues to grow. Too often, repetitive studies arise because researchers are not aware of the studies that other scientists are conducting, or have previously published. The research synthesis has arisen as an attempt to avoid the repetition and obtain a clear understanding of the state of the literature, and to provide a clear summary of current knowledge for clinicians. Its purpose is to integrate empirical research for the purpose of creating generalizations and to seek the limits and modifiers of those generalizations (Cooper & Hedges, 1994). Systematic reviews are especially useful in developing guidelines for patient care (e.g., The Quebec Task Force on Whiplash Associated Disorders; Spitzer et al., 1995). In order to conduct these research syntheses, the investigators must follow four steps: 1) outline a topic and identify studies regarding that topic, 2) develop a scheme for indexing and coding material (i.e., for rating articles and coding them according to quality), 3) integrate the studies, and 4) write the report (Cooper and Hedges, 1994).

Traditionally, reviews of the psychological literature have been narrative in nature. These reviews differ from systematic literature reviews or research syntheses with respect to the steps outlined by Cooper and Hedges (1994). As a result of these differences, there is the strong potential that a narrative review involves a biased citation of studies and conclusions based on results of studies that may or may not be methodologically sound. The systematic literature review avoids the pitfalls inherent in many narrative reviews because it is a scientific investigation in and of itself. It has pre-planned methods and uses the assembly of original studies as its participants (Cook, Mulrow, & Haynes, 1997). The main differences between these two types of reviews can be seen with respect to the first two steps stated above.

First, narrative reviews tend to deal with a variety of issues related to a given topic rather than dealing with a particular issue in depth (Cook et al., 1997). In contrast, a systematic literature review assembles, critically appraises, and then synthesizes the results of empirical studies that address a specific topic or problem (Cook et al., 1997). They also differ with respect to their methods of assembling articles to be included in the review. The sources used and the search for articles that is conducted in a narrative review is usually unspecified and potentially biased. Explicit criteria for the selection of articles are rarely stated prior to the search (Cook et al., 1997). This type of review cannot give the reader confidence that all potentially relevant articles have been considered or that articles have not been selected in a biased manner (i.e., that only those articles that support the author's ideas are included). In a systematic literature review, relevant articles are selected by conducting a thorough and explicit search of appropriate databases and other potentially important sources (Greenhalgh, 1997). Criteria for relevant articles are explicitly stated prior to the search in order to select articles in an unbiased manner. By including "a comprehensive search of all potentially relevant articles and the use of explicit, reproducible criteria in the selection of articles for review" (Cook et al., 1997, p. 377), bias and random error are limited in this type of review. Thus, a systematic literature review has advantages over narrative reviews with respect to comprehensiveness and the control of bias.

Narrative and systematic literature reviews also differ with respect to the way they deal with the articles that are considered relevant following the search. In a narrative review, relevant articles are usually summarized without explicit consideration of their scientific merit. As a result, it is not necessarily true that the conclusions drawn from this type of review are indicative of the findings of sound scientific research. In

contrast, in a systematic literature review, those articles that are deemed relevant are appraised with respect to their scientific merit. Only the results of scientifically sound articles are summarized to give an accurate picture of the current literature on the topic in question. By summarizing only the results of studies that have been appraised with respect to their research design and study characteristics, the reader can have confidence that the conclusions drawn are formed on scientifically admissible evidence. Thus, the systematic literature review avoids the pitfalls of the narrative review and provides important clinical information based on scientifically sound research.

Narrative reviews, however, are likely to be useful if one is summarizing a young, sparse literature or if the goal of the review is to outline theoretical conceptualizations or generate general hypotheses. A systematic review is more likely to be useful when dealing with a growing body of literature, or if the goal of the review is to answer a specific question regarding the current state of knowledge in that particular research area or to produce patient care guidelines. They are of little benefit when the literature is sparse, or if the goal is to look at theoretical conceptualizations. Thus, narrative reviews have clear advantages over systematic reviews when the goal is to describe current opinions or to focus on theory.

When a systematic review of the literature is undertaken, it is assumed that not all studies will be included as evidence. The goal of the systematic literature review is, after all, to provide useful information about the results of scientifically admissible studies. As a result, the literature in a given area is assessed with respect to the methodological quality. Wortman (1994) discussed an approach to assessing the research quality of studies. He stated that a study can be considered of good quality when it has been assessed for relevance and acceptability. The question of relevance is

addressed by ensuring that the studies being considered are relevant to the topic at hand. That is, the focus of the study and the concepts being measured within the study must be relevant to the focus of the literature review.

In the next step, the acceptability of a study is determined through an assessment of its methodological quality. Wortman (1994) discusses the importance of assessing for the presence of bias within a study in order to determine its acceptability. In the present review, the assessment of methodological quality was undertaken by employing criteria that are focused on the internal validity of a study. The criteria employed are described by Côté, Cassidy, Carroll, Frank, and Bombardier (2001). Seven “fatal flaws” that threaten the internal validity of a study are identified. They include inadequate information about the source population under study; unclear or inappropriate inclusion criteria for the study sample; unclear or inappropriate exclusion criteria; measures for the factors under study that are inadequate with respect to reliability and validity or inadequately defined; outcome measures lacking reliability and validity or inadequately defined; participation rate unreported, or no consideration of or adjustment for nonresponse bias; and zero time unidentified (in prognostic cohort studies). If a study has one of these flaws, it is considered unacceptable and excluded from further discussion. If a fatal flaw is not identified, the study is further evaluated on scientific merit and a decision is made on acceptability. All studies that meet the relevance and acceptability criteria are then included for further review.

Once acceptable articles have been identified, the next step is to integrate the results of the accepted studies. There are two methods of integrating the results. A qualitative systematic review summarizes but does not statistically combine the results of the accepted studies (Cook et al., 1997). However, it does qualitatively describe the



existing evidence and draws conclusions from that evidence. A quantitative approach to integrating the results is called a meta-analysis. In this form of integration, the results of the studies are combined using statistical methods. Both forms of integration provide important information regarding the state of the literature. However, the state of the literature also plays a role in the appropriateness of one form of integration over another. “When there are many studies high in internal and external validity on a well defined topic, pooling (averaging) effect sizes across the various studies may be done” (Slavin, 1986, p. 9). For a body of literature that contains few methodologically sound studies or studies that examine a variety of factors with little consistency in measures used or populations studied, a qualitative synthesis may be more appropriate.

When discussing the results of a systematic literature review, it becomes important to discuss the study designs of the accepted articles to be included in the final summary. Altman and Lyman (1998) describe a classification system for prognostic studies that will be used to guide the discussion of articles in the systematic literature reviews conducted in the present dissertation. Altman and Lyman (1998) describe three types of prognostic studies (phase I, phase II, and phase III). Phase I and phase II prognostic studies are exploratory studies. Phase I studies are described as those seeking an association between the variable of interest and the outcome under study. The analyses employed in this type of study tend to be univariate in nature and do not consider the impact of potential confounders to the relationship. In other words, they primarily examine crude relationships between the prognostic factor of interest and the outcome. Phase II studies are described as studies that generate hypotheses from extensive exploratory analyses of the data. The goal of this type of study is to predict outcome as effectively as possible by including all important prognostic factors in the

model. The analysis employed in this type of study usually consists of multivariate analyses, such as multiple regression analyses. Studies of this type tend to examine a variety of factors and their associations with the outcome of interest. Most (or many) of the prognostic studies in the psychological literature consist of phase I and II studies. Phase III studies are described as confirmatory studies with pre-stated research questions. Thus, a factor is specifically evaluated in order to confirm or refute its association with the outcome. The goal of this type of study is to examine the unique, independent relationship between a potential prognostic factor and the outcome of interest after adjusting for possible confounders. The analysis consists of constructing a model that explicitly tests the strength of the relationship between the exposure variable of interest and the outcome. In contrast with a Phase II prognostic study, in which the researcher is interested in identifying several or many factors which are associated with the outcome of interest, a Phase III prognostic study is concerned only with confirming or refuting the independence of the relationship between one particular prognostic factor (that is, a particular exposure variable) and the outcome of interest. Whereas, in Phase II studies, the explanatory factors are all of interest because they are all associated with the outcome of interest, in Phase III studies, confounders are of interest only to the extent to which they explain away the association between the prognostic factor of interest (exposure) and the outcome. Statistical significance of those factors (confounders) is not the issue. They are included regardless of statistical significance if they affect the association between the prognostic factor of interest and the outcome. The main purpose of their inclusion is to assess the prognostic impact of the variable of interest when confounders are controlled (Altman and Lyman, 1998). Thus, it is only in a Phase III prognostic study that the independence of a particular risk factor is rigorously tested.

Given the rapid growth in the coping literature, it appeared to be time to produce a systematic review of this literature. The literature on coping with pain continues to grow and, to date, little has been done to assemble, critically appraise, and integrate the results of this literature. In order to draw generalizations from the scientifically acceptable literature in this area and to obtain an understanding of the limits and modifiers of those generalizations, a systematic literature review was needed.

## 2.2 Methodology

The literature on coping continues to grow. However, there has been no attempt to assess the empirical literature with respect to scientific merit. One of the goals of the present dissertation was to conduct a systematic review of the literature on coping with pain. This systematic review included a critical review of the scientific merit of that literature in order to provide guidance to clinicians and other stakeholders regarding the factors associated with coping with pain.

Systematic reviews assemble, critically appraise, and synthesize the results of empirical studies that address a specific topic or problem (Cook et al., 1997). The goal of the present systematic literature review was to assess the literature that addressed the coping strategies used by individuals to deal with pain. The first step in this process was to formulate a specific question in order to facilitate the selection of relevant articles. In the present systematic review, the questions are “What factors are associated with the coping behavior individuals use to deal with their pain?” and “What relationship does coping behaviour have with outcome or adjustment?”

The next step involved a comprehensive search of appropriate databases (Greenhalgh, 1997). This included a systematic search of the Medline and PsycLIT/PsycINFO databases, which was conducted to assemble all potentially relevant

English language articles published between 1980 and 2001. The initial search was conducted in 1999. The search was repeated on October 15, 2001 to capture new articles that were published after the initial search. A final search was conducted in February 2002 to capture all abstracts included in Medline or PsycINFO that were published to the end of 2001.

Using the MESH term “Adaptation, Psychological” and the text terms of cope\* or copin\*, a Medline search of the English literature between the years of 1980 and 2001 was conducted. The coping literature was further limited to include only those studies relating to coping with pain. Due to the interest in pain, particularly neck and back pain, the literature search was limited by using the following MESH terms: Pain, Back Pain, Low Back Pain, Back Injuries, Neck Pain, Neck Injuries, and Accidents, Traffic. These terms were combined with the following text terms: pain, back pain, low back pain, back injur\*, neck pain, neck injur\*, traffic accident\*, car accident\*, and motor vehicle accident. A similar search was conducted on the Psyclit/PsycINFO database for the English literature from 1980 to 2001. The descriptive (DE) term used in the initial search was Coping Behaviour. To limit this coping literature, the same text terms from the Medline search were used. The text terms were used in conjunction with the following DE terms: Pain, and Motor Traffic Accidents. Using Reference Manager, a duplicate search was conducted with the Medline and Psyclit/PsycINFO search results in order to eliminate duplicate citations. The searches yielded 1072 abstracts. All abstracts were then reviewed and judged for relevance to the topic.

Abstracts were rated as relevant if the paper: 1) contained data, 2) was in English, and 3) related to coping with pain (e.g., use of coping behaviour to manage pain; the relationship between coping with pain and other factors) or coping with pain

from motor vehicle related injuries. Articles were excluded (i.e., rated as irrelevant) if they 1) did not contain data, 2) were in a foreign language, 3) studied the coping behaviour of those who have a child, spouse, or other relation suffering from pain or illness, or studied coping with non-health-related issues, and 4) studied coping with pain related to cancer or other illnesses in which pain is not the primary stressor. Those abstracts that did not contain enough information for a rating were rated as unknown and the article was reviewed for relevance.

All articles that were deemed relevant were read and assessed for scientific merit. This assessment was conducted using Access database critical review forms (Appendix A) developed at the Institute for Health and Outcomes Research, University of Saskatchewan. These forms contain guidelines that assess empirical studies for methodological soundness. These forms were modified from forms used by the Quebec Task Force (Spitzer et al., 1995), and are now being used by two international task forces, the WHO Task Force on Mild Brain Injury and the Decade of the Bone and Joint 2000 to 2010 Task Force on Neck Pain and its Associated Disorders. Studies that were considered to be scientifically admissible were included in the evidence tables, which summarizes the results of all accepted papers.

## 2.3 Results

### 2.3.1 Search Results

The Medline and PsycLIT/PsycINFO searches yielded a total of 1072 abstracts. A review of the abstracts identified 194 articles as relevant to the study of coping with chronic pain. An additional 140 abstracts could not be rated due to insufficient information from the abstract. Those articles were obtained and 47 were subsequently rated as relevant to the current review. Thus, a total of 241 articles were identified for

review. Of the 241 articles that were read, 49 were subsequently excluded because they did not meet the inclusion criteria for the present review. Thus, 192 articles were critically reviewed (Appendix B). Table 2.1 describes the results of the literature searches.

Of these 192 articles, 30 were judged to be scientifically admissible. Table 2.2 provides information regarding the number of articles dealing with the various pain populations. Twenty articles were cross-sectional in design and ten were cohort studies. Before turning to a discussion of the findings of these articles, the measures used to assess coping in these papers are first described.

Table 2.1 Summary of Literature Search Results

Search	Rating		Total
	Relevant/Reviewed	Irrelevant	
Original (1980-1999)	140	704	844
New (1999-2001)	46	159	205
Latest (Feb 2002)	6	17	23
Total	192	880	1072

### 2.3.2 Coping Measures

Several scales were used to assess coping behaviour in pain sufferers. Table 2.3 provides a description of each measure, including descriptions of the individual strategies/subscales. The most commonly used measure of coping behaviour in the accepted studies was the Coping Strategies Questionnaire (CSQ). The original measure was described in Rosenstiel and Keefe's 1983 article. At least one study employed a

Table 2.2 Summary of Reviewed Articles and Study Design of Accepted Articles

Population	Reviewed	Accepted		
		Cross-sectional	Cohort	Total
LBP	30	1	1	2
Neck/LBP	4	2	0	2
RA	35	1	3	4
OA	13	1	0	1
Fibromyalgia	15	1	0	1
TMJ/Facial	6	3	0	3
Sickle Cell Disease	11	2	3	5
Headache	16	1	0	1
Chronic Pain-Mixed (Inpatient)	12	2	1	3
Chronic Pain-Mixed (Outpatient)	43	5	2	7
Other	7	1	0	1
Total	192	20	10	30

Finnish version of the CSQ with somewhat altered scales (Härkäpää, 1991). Often, investigators used composite factors of the original CSQ scales in their analyses.

Descriptions of these factors are also provided in Table 2.3. The factors varied across samples and pain populations. Other coping measures used included the Vanderbilt Pain Management Inventory (PMI; Brown and Nicassio, 1987), Coping with Specific Symptoms Questionnaire (CSSQ; Jaspers et al., 1993), Pain Coping Inventory (PCI; Hopman-Rock et al., 1998; Kraaimaat et al., 1988), Chronic Pain Coping Inventory (CPCI; Jensen et al., 1995), and Coping with Rheumatic Stressors (van Lankveld et al., 1994).

Table 2.3 Coping measures and subscale descriptions

Coping Measure	Description/Definition
<b>Coping Strategies Questionnaire (Rosenstiel and Keefe, 1983)</b>	
<b>Original Subscales</b>	
Diverting Attention	Thinking of things that serve to distract one away from the pain (e.g., I count numbers in my head or run a song through my mind).
Coping Self-statements	Telling oneself that one can cope with the pain, no matter how bad it gets (I tell myself to be brave and carry on despite the pain).
Ignoring Pain Sensations	Denying that the pain hurts or affects one in any way (I tell myself it doesn't hurt).
Reinterpreting Pain Sensations	Imagining something, which if real, would be inconsistent with the experience of pain (I just think of it as some other sensation, such as numbness).
Increasing Activity Levels	Engaging in active behaviours that divert one's attention away from the pain (I do something active, like household chores or projects).
Increasing Pain Behaviour	Overt pain behaviours that reduce pain sensations (I take my medication).
Catastrophizing	Negative self-statements, catastrophizing thoughts and ideation (I worry all the time about whether it will end).
Praying/Hoping	Telling oneself to hope and pray that the pain will get better someday (I pray to God it won't last long).
<b>Revised Subscales/Coping Factors</b>	
Preventive actions	Composed of items added to the Finnish CSQ to describe preventive action (Härkäpää, 1991). Included items such as "I decide to resume back exercising" and "I decide to remember good working postures and movements in the future".
Self-care	Composed of items added to the Finnish CSQ to describe self-care (Härkäpää, 1991). Included items such as "I do back exercises" and "I change my position to suit my back better".
Diverting attention/increasing activity	Composed of some items from each of the original subscales (e.g., I play mental games with myself to keep my mind off the pain; Härkäpää, 1991).
Continuing activity	I go on with what I was doing (Härkäpää, 1991).
Coping Self-statements/ignoring pain	Composed of some items from each of the original subscales (e.g., I know I can handle if, even if I have pain; Härkäpää, 1991)
Active Coping	Reinterpreting Pain Sensations, Coping Self-statements, Diverting Attention, Ignoring Pain Sensations, and Increasing Behavioural Activity (Soares & Grossi, 1999; Snow-Turek et al., 1996).
Passive Coping	Catastrophizing and Praying/hoping (Soares & Grossi, 1999; Snow-Turek et al., 1996).
Coping Attempts	Composed of the Ignoring Pain Sensations, Diverting Attention, Coping Self-statements, Increasing Activity Level, and Reinterpreting Pain Sensations subscales of the CSQ (Jensen et al., 1992; Martin et al., 1996). All subscales have a positive loading on this factor. For



	adult sickle cell samples, this factor also included the praying and hoping subscale (Gil et al., 1989).
Pain Control and Rational Thinking	Composed of the two self-efficacy ratings from the CSQ (Control over pain and ability to decrease pain) and negative loading from the Catastrophizing and Praying/Hoping subscales.
Cognitive Coping Attempts	Coping self-statements, Ignoring pain sensations, and Diverting Attention (Jensen et al., 1994).
Conscious Cognitive Coping	Coping self-statements, Reinterpreting pain sensations, and Ignoring Pain sensations (Grossi et al., 1999).
Helplessness	Negative loading from the self-efficacy items and positive loading from catastrophizing and praying/hoping (Jensen et al., 1992). Catastrophizing and Praying/hoping (Jensen et al., 1994).
Pain Avoidance	Diverting Attention, Praying/hoping, Catastrophizing, Increasing behavioural activities, and Pain behaviours (Grossi et al., 1999).
Negative Thinking and Passive Adherence	This factor consists of the original Catastrophizing subscale and negative loadings of the ability to decrease and control pain items. It also includes items specifically added for sickle cell patients, which assess the use of the following strategies: fear self-statements, anger self-statements, resting, heat/cold massage, taking fluids, and isolation (Gil et al., 1989; Gil et al., 1992).
Negative Thinking	In children and adolescents with sickle cell disease, the Negative thinking/passive adherence factor was divided into two. This factor consisted of catastrophizing, fear self-statements, anger self-statements and isolation (Gil et al., 1991, Gil et al., 1993).
Passive Adherence	This factor consisted of resting, taking fluids, praying and hoping, heat/cold/massage, and the two self-efficacy ratings (Gil et al., 1991, Gil et al., 1993).
<b>Pain Management Inventory (Brown &amp; Nicassio, 1987)</b>	
Passive Coping	Coping strategies that involve giving responsibility for pain management to an outside source or allowing other areas of life to be adversely affected by pain
Active Coping	Coping strategies that require the patient to take responsibility for pain management and involve attempts to control the pain or to function in spite of it.
<b>Coping with Specific Symptoms Questionnaire (Jaspers et al., 1993)</b>	
The following scales are named without any description: Problem-focused coping, Seeking social support, Expression of emotion, Regulation of emotion, Avoidance, Comforting Thinking, Wishful thinking, and Palliative coping.	
<b>Pain Coping Inventory (Hopman-Rock et al., 1998; Kraaimaat et al., 1988)</b>	
Hopman-Rock et al.(1998) utilized the following subscales: comforting/pain transformation, withdrawal, and applying nonallopathic treatment.	

Kraaimaat et al., 1988 used the subscales of avoiding mental and physical effort, worrying, distraction, taking it easier, seeking social support, and applying nonallopathic treatment such as homeopathy and mesmerism.	
Chronic Pain Coping Inventory (Jensen et al., 1995)	
Guarding	Avoided using part of my body (e.g., hand, arm, leg); Held on to something when getting up or sitting down.
Resting	I took a rest; I went to bed early to rest.
Asking for Assistance	Asked someone to do something for me; Asked for help with a chore or task.
Opioid Medication Use	People were asked to list each medication they took for pain during the past week and the number of days they took each medication during the past week. Medications were then categorized according to content (opioid, sedative, or non-steroidal) and number of days for each type of medication category was summed.
Non-steroidal Medication Use	
Sedative-Hypnotic Medication Use	
Relaxation	Imagined a calming or distracting image to help me relax; Focused on relaxing my muscles.
Task Persistence	Kept on doing what I was doing; Ignored the pain
Exercise/stretch	Stretched the muscles in my legs and held the stretch for at least 10 seconds; Exercised to strengthen the muscles in my arms for at least 1 minute.
Coping Self-statements	Remind myself that things could be worse; Told myself things will get better.
Seeking social support	Made arrangements to see a friend or family member; I got support from a friend.
Coping with Rheumatic Stressors (van Lankveld et al., 1994; van Lankveld et al. 1999)	
Comforting Cognitions	The use of reassuring self-statements (e.g., I think the pain will decrease in time).
Decreasing Activity	I stop my activities; I take a rest by sitting or lying down.
Diverting Attention	I think of pleasant things; I engage myself in activities that will distract me from the pain.

### 2.3.3 Factors Associated with Coping

Thirty articles were acceptable according to the standards outlined for the review of the coping literature. Twenty of these articles were cross-sectional in design. These studies provided some information about factors that are associated with coping. Some of these studies examined crude relationships between coping and other factors. Other

studies provided information regarding the strength of the relationship between coping and other factors when other important variables were adjusted for in the equation (i.e., multivariate analyses were used). A summary of the study samples, coping measures used, factors under study and results of the accepted cross-sectional studies are presented in Table 2.4. Ten articles described prognostic cohort studies. All of the accepted prognostic studies can be classified as exploratory, that is, Phase I or Phase II studies, according to Altman & Lyman's (1998) classification system. Phase II studies (i.e., studies using multivariable analyses to examine the associations between variables under study and coping) can be considered as stronger evidence than Phase I studies for the existence and strength of these relationships. None of the studies reviewed were confirmatory. A summary of the study design, study sample, coping measures used, factors under study and results of the accepted cohort studies (evidence tables) are presented in Table 2.5. Various factors were studied with respect to their association with coping. The strategies of catastrophizing and passive coping were the most extensively studied. However, even with those two strategies, the factors studied were varied, with insufficient consistency between studies to justify statistical integration of results. For example, in the two cohort studies that examined catastrophizing, one was a treatment study that examined the impact of treatment on use of catastrophizing while the other study examined catastrophizing as a predictor of several outcome measures. For passive coping, the three studies varied with respect to the outcome measures included in the studies. As a result, the following review is a qualitative summary of the best evidence in the literature on coping with pain.

Table 2.4 Summary of Accepted Cross-sectional Studies: Sample Characteristics, Coping Measure, Factors Studied, & Results

Author	Sample	Coping Measure	Factors Studied	Results
Härkäpää (1991)	<ul style="list-style-type: none"> <li>• LBP at least 2 years</li> <li>• LBP causes some disability</li> <li>• Engaged in physically strenuous or moderately strenuous work for at least 10 years</li> <li>• N=415</li> </ul>	Coping Strategies Questionnaire (Finnish Version)	<ul style="list-style-type: none"> <li>• Age</li> <li>• Gender</li> <li>• Psychological distress</li> <li>• Health locus of control</li> </ul>	<ul style="list-style-type: none"> <li>• Being a woman (OR=1.7, 95%CI=1.1-2.7) &amp; internal back pain LOC (OR=1.6, 95%CI=1.2-2.0) was associated with Preventive Actions.</li> <li>• Being a woman (OR= 2.1, 95%CI=1.3-3.2) &amp; internal LOC (OR=1.4, 95%CI=1.1-1.7) was associated with Coping self-statements.</li> <li>• Greater psychological distress (OR=1.8, 95%CI= 1.1-3.0) &amp; higher pain severity (OR=1.0, 95%CI=1.0-1.0) was associated with Catastrophizing.</li> <li>• Being a woman (OR=2.9, 95%CI=1.8-4.6) &amp; higher pain severity (OR=1.0, 95%CI=1.0-1.0) was associated with Hoping/praying.</li> <li>• Being a woman (OR=1.7, 95%CI=1.1-2.5) was associated with Diverting Attention.</li> <li>• Having an “others” LOC (OR=0.8, 95%CI=0.6-1.0) &amp; an internal back pain LOC (OR=1.9, 95%CI=1.4-2.4) was associated with Self-care as a coping strategy.</li> </ul>
Jensen et al.	<ul style="list-style-type: none"> <li>• Neck, shoulder, or back</li> </ul>	CSQ	<ul style="list-style-type: none"> <li>• Gender</li> </ul>	<ul style="list-style-type: none"> <li>• Being a woman was associated with</li> </ul>

(1994)

pain

- 20-55 years old
- Scandinavian origin
- N=121

- Subjective health status
- Pain severity
- Disability
- Occupation
- Pain topography
- Pain-related consequences

Catastrophizing ( $\beta=2.74$ ) after adjusting for occupation, subjective health status, and pain topography.

- In women, subjectively better health status was positively related to catastrophizing ( $\beta=2.92$ ), after adjusting for occupation and pain topography. Having a mixed pain area was associated with less use of Coping self-statements ( $\beta=-7.29$ ) and Ignoring Pain sensations ( $\beta=-6.63$ ), after adjusting for occupation and subjective health status.

- In men, the occupation of Domestic Work was associated with Reinterpreting Pain Sensations ( $\beta=5.99$ ), after adjusting for subjective health status and pain topography.
- Being a woman ( $\beta=0.705$ ), having a higher education level ( $\beta=0.760$ ), fewer depressive symptoms ( $\beta=-0.052$ ), better general health ( $\beta=0.039$ ), and higher exercise frequency ( $\beta=0.291$ ) were associated with Active coping, after adjusting for age.
- Being married ( $-0.909$ ), having more depressive symptoms ( $0.102$ ), poorer general health ( $-0.044$ ), and more

Mercado et al.  
(2000)

- LBP or neck pain
- General population
- 20-69 years old
- N=655

PMI

- Age
- Gender
- Marital status
- Education
- Employment status
- Pain severity
- General health
- Depressive symptoms
- Comorbid

van Lankveld et al. (1994)	<ul style="list-style-type: none"> <li>• Classical or definite Rheumatoid Arthritis</li> <li>• Randomly selected clinic patients</li> <li>• N=415</li> </ul>	CORS	<ul style="list-style-type: none"> <li>• medical conditions</li> <li>• Exercise frequency</li> <li>• Well-being/ quality of life</li> <li>• Depressive mood</li> <li>• Cheerful mood</li> <li>• Current disease activity</li> <li>• Pain intensity</li> <li>• Functional capacity</li> </ul>	<p>severe neck or low back pain (1.846) were associated with Passive coping, after adjusting for age and gender.</p> <p>After adjusting for age, gender, education, duration of arthritis complains, and two measures of pain intensity:</p> <ul style="list-style-type: none"> <li>• Comforting cognitions was associated with better quality of life (<math>r=0.17</math>), less depressed mood (<math>r=-0.34</math>), and more cheerful mood (<math>r=0.35</math>)</li> <li>• Decreasing activity was associated with lower quality of life (<math>r=-0.23</math>) and less cheerful mood (<math>r=-0.24</math>).</li> <li>• Diverting Attention was associated with better quality of life (<math>r=0.14</math>).</li> <li>• After adjusting for age, sex, education, marital status, pain chronicity, fatigue intensity, body mass index, radiologic OA, comorbid mobility problems, sport activities, and pain severity, Resting was associated with increased physical disability (<math>r=0.32</math>).</li> </ul>
Hopman-Rock et al. (1998)	<ul style="list-style-type: none"> <li>• Hip or knee pain</li> <li>• General population</li> <li>• 55 years and older</li> <li>• No cognitive impairments and not living in a care home</li> <li>• N=141</li> </ul>	Pain Coping Inventory	<ul style="list-style-type: none"> <li>• Physical disability</li> </ul>	
Martin et al. (1996)	<ul style="list-style-type: none"> <li>• Fibromyalgia</li> <li>• Clinic patients</li> <li>• 18-65 years old</li> <li>• no other rheumatologic disorders</li> <li>• N=80</li> </ul>	CSQ	<ul style="list-style-type: none"> <li>• Physical disability</li> <li>• Psychosocial disability</li> <li>• Total disability</li> </ul>	<p>After adjusting for age, education, pain duration, disease severity, and neuroticism:</p> <ul style="list-style-type: none"> <li>• Coping attempts was associated with greater total disability and physical disability, and with lower levels of psychosocial disability</li> </ul>

Kraaimaat et al. (1988)	<ul style="list-style-type: none"> <li>• Headache sufferers of moderate to high severity</li> <li>• Random sample of the members of a Dutch Migraine Patient Foundation</li> <li>• N=441</li> </ul>	PCI	<ul style="list-style-type: none"> <li>• Causal attributions for headaches</li> </ul>	<ul style="list-style-type: none"> <li>• Catastrophizing was only associated with higher levels of total disability when adjusting for those factors. When neuroticism was not included in the equation, Catastrophizing was associated with physical and psychosocial disability</li> </ul> <p>Regression coefficients providing information regarding the strength of the association were not reported by the authors.</p> <p>After adjusting for headache severity:</p> <ul style="list-style-type: none"> <li>• The attribution of external physical causes was associated with use of more nonallopathic treatment to cope with pain (<math>r=0.16</math>), distraction (<math>r=0.13</math>), and worrying (<math>r=0.15</math>).</li> <li>• The attribution of inborn somatic causes was correlated with less use of Distraction (<math>r=-0.02</math>).</li> <li>• The attribution of psychological causes was associated with greater use of Worrying as a coping strategy (<math>r=0.15</math>).</li> <li>• After adjusting for pain intensity and psychological beliefs about pain, Catastrophizing was related to higher levels of anxious mood (<math>\beta=0.427</math>), clinical anxiety (<math>OR=1.125</math>), depressed mood (<math>\beta=0.625</math>), and</li> </ul>
Madland et al (2000)	<ul style="list-style-type: none"> <li>• Facial arthromyalgia</li> <li>• Newly referred patients</li> <li>• 18-70 years old</li> <li>• no other chronic or psychiatric illness</li> <li>• N=76</li> </ul>	CSQ	<ul style="list-style-type: none"> <li>• Anxiety</li> <li>• Depression</li> </ul>	

Turner et al. (2001)	<ul style="list-style-type: none"> <li>• Temporomandibular Disorders (RDC/TMD Axis I diagnosis)</li> <li>• Patients seeking care at TMD specialty clinic</li> <li>• Reporting pain-related disability</li> <li>• 18-70 years old</li> <li>• Excluded if further diagnostic evaluation needed or presence of major medical or psychiatric conditions that would interfere in ability to participate/benefit from study</li> <li>• N=118</li> </ul>	CSQ	<ul style="list-style-type: none"> <li>• Pain control beliefs</li> <li>• Interference with activity</li> <li>• Depression</li> <li>• Jaw activity limitations</li> <li>• Jaw opening impairments</li> </ul>	<p>clinical depression (OR=1.094).</p> <ul style="list-style-type: none"> <li>• After adjusting for age, gender, pain intensity, pain beliefs, and other coping scales, Catastrophizing was associated with more depression (<math>r=0.60</math>).</li> <li>• Zero-order correlations found Diverting Attention to be associated with greater activity interference (<math>r=0.22</math>) &amp; Praying/Hoping to be associated with more interference (<math>r=0.30</math>), more masticatory jaw activities (<math>r=0.18</math>), and more non-masticatory jaw activities (<math>r=0.25</math>). High levels of coping self-statements were correlated with less depression (<math>r=-0.29</math>).</li> </ul>
Jaspers et al. (1993)	<ul style="list-style-type: none"> <li>• Temporomandibular joint pain</li> <li>• Patients referred to oral surgery department</li> <li>• N=53</li> </ul>	CSSQ	<ul style="list-style-type: none"> <li>• Psychological distress</li> <li>• General well-being</li> <li>• Pain</li> <li>• MPI scales (activity, negative mood, pain-severity, etc.)</li> </ul>	<p>After adjusting for all other coping subscales:</p> <ul style="list-style-type: none"> <li>• Expression of emotion was associated with poor psychological health (<math>\beta=0.56</math>), greater psychosocial distress (<math>\beta=0.41</math>), greater levels of interference (<math>\beta=0.58</math>) and higher levels of negative mood (<math>\beta=0.67</math>).</li> <li>• Wishful thinking was associated with more psychosocial distress (<math>\beta=0.44</math>), higher levels of pain</li> </ul>



Gil et al. (1989)	<ul style="list-style-type: none"> <li>• Sickle-cell disease</li> <li>• Adult clinic outpatients</li> <li>• N=79</li> </ul>	CSQ (revised for SCD patients)	<ul style="list-style-type: none"> <li>• Pain severity</li> <li>• Frequency of painful episodes</li> <li>• Pain duration</li> <li>• Activity reduction</li> <li>• “uptime”</li> <li>• psychological distress</li> <li>• health care use: ER visits, hospitalization</li> </ul>	<p>(beta=0.52) and fewer general activities (beta=0.64).</p> <p>After adjusting for age, sex and disease severity:</p> <ul style="list-style-type: none"> <li>• Negative Thinking/Passive Adherence was associated with higher severity of pain episodes (beta=0.05).</li> </ul> <p>After adjusting for age, sex, disease severity, and frequency of painful episodes:</p> <ul style="list-style-type: none"> <li>• Negative Thinking/Passive Adherence was associated with increased activity reduction (beta=0.53), less “uptime” (beta=-0.11), higher levels of psychological distress (beta=0.01), more ER visits (beta=0.10), and more frequent hospitalizations (beta=0.05).</li> <li>• Coping Attempts was associated with less activity reduction (beta=-0.22).</li> </ul> <p>After adjusting for age and frequency of painful episodes:</p> <ul style="list-style-type: none"> <li>• Coping Attempts was associated with lower frequency of ER visits (beta=-0.02) and less household activity reduction (beta=-0.36).</li> <li>• Passive Adherence was associated with more ER visits (beta=0.03) and more household (0.56), school (0.56), and social activity reduction (0.54).</li> <li>• Negative Thinking was associated</li> </ul>
Gil et al. (1991)	<ul style="list-style-type: none"> <li>• Sickle-cell disease</li> <li>• 7-17 years old</li> <li>• Clinic patients</li> <li>• N=72</li> </ul>	CSQ	<ul style="list-style-type: none"> <li>• Age</li> <li>• Frequency of painful episodes</li> <li>• Activity reduction</li> <li>• Psychological distress</li> <li>• Health care utilization</li> </ul>	

Ulmer (1997)	<ul style="list-style-type: none"> <li>• Burn injury (10% or greater burn)</li> <li>• Treated at a regional burn centre</li> <li>• 18-70 years old</li> <li>• able to communicate 3-6 days post injury</li> <li>• Exclusion: Burn self-inflicted or due to abuse; loss of significant other due to cause of injury</li> <li>• N=32</li> </ul>	CSQ	<ul style="list-style-type: none"> <li>• Pain intensity</li> <li>• Pain distress</li> <li>• Depressed mood</li> <li>• Analgesic use</li> </ul>	<p>with more household activity reduction (0.35) and greater overall level of psychological distress (0.36). The authors also examined coping in the subset of adolescents (13-17 years of age) and found Negative Thinking was associated with greater psychological distress (0.61), after adjusting for frequency of painful episodes.</p> <ul style="list-style-type: none"> <li>• Pain intensity (<math>r=0.51</math>) and pain distress (<math>r=0.42</math>) was found to be correlated with greater use of Catastrophizing in this pain population</li> </ul>
Jensen & Karoly (1991)	<ul style="list-style-type: none"> <li>• Chronic pain patients who had completed an inpatient multidisciplinary pain program</li> <li>• LBP, headache, cervical pain, other</li> <li>• N=118</li> </ul>	CSQ	<ul style="list-style-type: none"> <li>• Psychological functioning</li> <li>• Activity level</li> <li>• Medication use</li> <li>• Professional services utilization</li> </ul>	<p>After adjusting for pain severity:</p> <ul style="list-style-type: none"> <li>• Increasing Activities was associated with psychological functioning (i.e., higher life satisfaction and lower levels of depression; <math>\beta=0.35</math>).</li> <li>• Ignoring Pain was associated with better psychological functioning (<math>\beta=0.27</math>). Ignoring Pain interacted with pain severity in its association to</li> </ul>

Jensen et al.  
(1992)

- Chronic pain patients admitted to an inpatient multidisciplinary pain program
- 18-65 years old
- no evidence of dementia or brain injury
- LBP, leg, headache, neck, shoulder/arm, abdomen, upper back, pelvis, anal/genital, and multiple pain sites
- N=117

CSQ

- Psychological dysfunction
- Physical dysfunction
- Depression

activity level ( $\beta=-0.55$ ). With lower pain severity, the relationship between Ignoring Pain and higher activity level was stronger.

- Coping Self-statements was associated with psychological functioning ( $\beta=0.32$ ). It also interacted with pain severity to be associated with activity level ( $\beta=-0.69$ ). Again, with lower pain severity, the relationship between Coping self-statements and higher activity level was stronger.
- Diverting Attention was associated with higher activity levels, in interaction with pain severity ( $\beta=-0.49$ ).

After adjusting for age, gender, duration of pain, pain intensity, and pain site:

- Coping Attempts was related to higher levels of psychosocial dysfunction ( $\beta=0.19$ )
- Helplessness was related to higher levels of psychosocial dysfunction ( $\beta=0.38$ ) and depression ( $\beta=0.40$ ).
- Reinterpreting pain sensations was associated with higher levels of psychosocial dysfunction ( $\beta=0.23$ ).
- Coping self-statements interacted with

Grossi et al.  
(1999)

- Chronic pain patients seeking care to alleviate pain from GP or physiotherapist
- 18-64 years old
- Back pain, neck/shoulder pain, multiple sites & other
- N=586

CSQ

- Sick leave
- Perceived disability
- Emotional distress
- Job strain
- Burnout
- Pain factors (duration, intensity, frequency, complexity)
- Use of analgesics & sedatives
- Number of previous treatment

pain intensity, so that it was related to more physical dysfunction only in medium and high levels of pain intensity

- Catastrophizing was related to higher levels of psychosocial dysfunction (beta=0.38) and depression (beta=0.54). It also interacted with pain duration, so that it was associated with greater psychosocial dysfunction in patients with short and medium pain duration.
- After adjusting for age, gender, marital status, occupation, foreign background, pain intensity, and diagnosis, Pain Avoidance was associated with greater perceived disability (beta=1.26).

Grossi et al. (2000)	<ul style="list-style-type: none"> <li>• Chronic pain patients seeking care to alleviate pain from GP or physiotherapist</li> <li>• 18-64 years old</li> <li>• Swedish origin</li> <li>• Back pain, neck/shoulder pain, multiple sites &amp; other</li> <li>• N=446</li> </ul>	CSQ	<ul style="list-style-type: none"> <li>• Post-traumatic stress</li> <li>• Age</li> <li>• Gender</li> <li>• Other demographics</li> <li>• Work strain</li> <li>• Burnout</li> <li>• Psychiatric morbidity</li> <li>• Self-esteem</li> <li>• PTS symptoms</li> </ul>	<ul style="list-style-type: none"> <li>• The association between gender and CSQ coping was not significant when adjusting for marital status, occupation, working hours, work strain, emotional distress, pain complexity, perceived disability, use of medication, and mean number of previous treatment.</li> <li>• Gender and measures of emotional distress (i.e., post-traumatic stress reaction, self-esteem, anxiety/depression, and burnout) interacted in its association with catastrophizing. Women with high levels of emotional distress were more likely to report greater use of catastrophizing.</li> <li>• Catastrophizing was higher in women with greater disability and a history of treatment for pain.</li> <li>• In men, none of these variables were significantly associated with catastrophizing.</li> </ul>
Snow-Turek et al. (1996)	<ul style="list-style-type: none"> <li>• Chronic pain patients referred to pain clinic</li> <li>• Arthritis, neuralgia, headache, diabetic neuropathy, cancer pain</li> </ul>	CSQ and PMI	<ul style="list-style-type: none"> <li>• Distress level</li> <li>• Depression</li> <li>• Activity level</li> </ul>	<ul style="list-style-type: none"> <li>• Passive Coping (CSQ and PMI) was associated with more psychological distress (beta=0.46 and 0.89, respectively) and depression (beta=0.81 and 1.34, respectively)</li> </ul>

- N=76
- |                        |  |                          |   |   |
|------------------------|--|--------------------------|---|---|
| Soares & Grossi (1999) | <ul style="list-style-type: none"> <li>• Chronic pain patients seeking care to alleviate pain from GP or physiotherapist</li> <li>• 18-64 years old</li> <li>• Back pain, neck/shoulder pain, multiple sites &amp; other</li> <li>• N=586</li> </ul> | CSQ (active vs. passive) | <ul style="list-style-type: none"> <li>• Native vs. immigrant</li> <li>• Age</li> <li>• Gender</li> <li>• Marital status</li> <li>• Occupation</li> <li>• Education</li> <li>• Financial strain</li> <li>• Self-efficacy</li> <li>• Burnout</li> <li>• Job strain</li> <li>• Pain factors</li> <li>• Psychological distress</li> <li>• PTS symptom</li> <li>• Disability</li> <li>• Depression</li> </ul> | <ul style="list-style-type: none"> <li>• After adjusting for age, gender, SES, disability support status, pain duration, and pain severity, Active Coping (CSQ) was associated with more depression (beta=0.03) and lower activity level (beta=-0.17). However, Active Coping (PMI) was also associated with higher activity level (beta=1.19).</li> <li>• In immigrants to Sweden, education was negatively associated with Passive coping. Having mandatory schooling (beta=-0.36) or a high school education (beta=-0.45) was negatively associated with passive coping.</li> <li>• In Swedish natives, occupation (i.e., being in blue-collar [beta=0.40] or low white-collar [beta=0.36] occupations), being a woman (beta=0.26), and high financial strain (beta=-0.12) was associated with passive coping</li> </ul> |
| Turner et al. (2000)   | <ul style="list-style-type: none"> <li>• Chronic pain patients attending multidiscipline pain clinic</li> <li>• 18 years or older</li> <li>• Pain in back, neck,</li> </ul>  | CSQ and CPCI             |   | <ul style="list-style-type: none"> <li>• After adjusting for age, gender, pain intensity, pain beliefs, and other coping strategies, Catastrophizing was associated with higher levels of depression (beta=0.56).</li> </ul>  |

upper extremity/  
shoulder, head, or lower  
extremity

- N=169

- After adjusting for age, gender, pain intensity, pain beliefs, catastrophizing and other coping strategies, Activity Reduction was associated with greater physical disability (beta=0.42).
-

Table 2.5 Summary of Accepted Cohort Studies: Sample Characteristics, Coping Measure, Factors Studied & Results

Author	Study Design	Sample	Coping Measure	Factors Studied	Results
Graver et al. (1995)	Cohort Phase I	<ul style="list-style-type: none"> <li>• Herniated intervertebral Lumbar disc surgery</li> <li>• &lt;70 years old</li> <li>• N=122</li> </ul>	Pain Management Inventory	<ul style="list-style-type: none"> <li>• Leg and back pain intensity</li> <li>• Clinical and neurological exam</li> <li>• Functional status</li> <li>• Analgesics</li> <li>• Clinical overall score (composite of all other outcome measures)</li> </ul>	<ul style="list-style-type: none"> <li>• Passive coping was of predictive value for individual terms of the clinical overall score but active coping was not. A review of the factors making up the clinical score indicated that passive coping was positively associated with greater leg pain (<math>r=0.30</math>).</li> </ul>
Sharpe et al. (2001)	Cohort Phase I	<ul style="list-style-type: none"> <li>• Classical or definite RA &lt; 2 years</li> <li>• Clinic patients</li> <li>• Seropositive for RA</li> <li>• 18-75 years</li> <li>• No history of mental illness, alcohol or drug abuse</li> <li>• N=45</li> </ul>	CSQ	<ul style="list-style-type: none"> <li>• Treatment (CBT vs. standard)</li> </ul>	<ul style="list-style-type: none"> <li>• The CBT group increased in the use of Reinterpreting Pain in comparison to the standard group over time.</li> <li>• Increasing activity showed a main effect for time at both post-treatment and follow-up, indicating an increase in use of this coping strategy for both groups.</li> </ul>
Brown et al. (1989)	Cohort Phase II	<ul style="list-style-type: none"> <li>• Classical or definite RA for &lt; 7 years</li> </ul>	PMI	<ul style="list-style-type: none"> <li>• Depression</li> <li>• Pain severity/</li> </ul>	After controlling for depression at baseline, age, education level,



			<ul style="list-style-type: none"><li>• 18 years old &amp; over</li><li>• N=287</li></ul>		<ul style="list-style-type: none"><li>• frequency</li><li>• Functional disability</li></ul>	illness duration, functional disability, and medication status variables: <ul style="list-style-type: none"><li>• Passive Coping was associated with higher levels of depression. Passive Coping also interacted with pain intensity; depression was more severe at six months when participants engaged in more passive coping during high levels of pain intensity.</li><li>• Active coping was associated with lower levels of depression at six months.</li><li>• After controlling for dexterity at baseline, impairment at baseline, and disease activity and pain at both baseline and follow-up, the use of the coping strategy Decreasing Activity at baseline was associated with less dexterity at one-year follow-up (beta=-0.34).</li></ul>
43	Van Lankveld et al (1999)	Cohort Phase II	<ul style="list-style-type: none"><li>• Definite RA</li><li>• Clinic patients</li><li>• N=94</li></ul>	CORS Decreasing activity scale	<ul style="list-style-type: none"><li>• Hand dexterity</li><li>• Pain intensity</li><li>• Disease activity</li><li>• Impairment</li></ul>	<ul style="list-style-type: none"><li>• After controlling for dexterity at baseline, impairment at baseline, and disease activity and pain at both baseline and follow-up, the use of the coping strategy Decreasing Activity at baseline was associated with less dexterity at one-year follow-up (beta=-0.34).</li></ul>
	Gil et al. (1992)	Cohort Phase II	<ul style="list-style-type: none"><li>• Sickle-cell disease</li><li>• Adult clinic outpatients</li><li>• N=89</li></ul>	CSQ	<ul style="list-style-type: none"><li>• Health care use</li><li>• Activity change</li><li>• Gender</li></ul>	After controlling for age, gender, phenotype, number of complications and frequency of painful episodes: <ul style="list-style-type: none"><li>• Negative Thinking/Passive</li></ul>

					<ul style="list-style-type: none"><li>• Age</li></ul>	Adherence at baseline was associated with more frequent (beta=0.02) and longer hospitalizations (beta=0.04), less “uptime” (beta=0.05) and higher percentages of household (beta=0.39), work (beta=0.39), and social activity reduction (beta=0.31) over the follow-up period. <ul style="list-style-type: none"><li>• Coping Attempts at baseline was associated with lower household activity reduction over the follow-up period (beta=-0.15).</li></ul>
✂	Gil et al. (1993)	Cohort Phase II	<ul style="list-style-type: none"><li>• Sickle-cell disease</li><li>• 7-17 years old</li><li>• Clinic patients</li><li>• N=70</li></ul>	CSQ	<ul style="list-style-type: none"><li>• Health care use</li><li>• “uptime”</li><li>• Activity reduction</li></ul>	After controlling for age and frequency of painful episodes: <ul style="list-style-type: none"><li>• Passive Adherence was associated with more frequent contact with health care providers (beta=0.05).</li><li>• Coping attempts was associated with less school (beta=-0.55), household (beta=-0.30), and social activity reduction (beta=-0.31) and higher levels of “uptime” (beta=0.06).</li></ul>
	Gil et al. (1997)	Cohort	<ul style="list-style-type: none"><li>• Sickle-cell disease</li><li>• Clinic patients</li></ul>	CSQ	<ul style="list-style-type: none"><li>• Coping stability is</li></ul>	<ul style="list-style-type: none"><li>• Coping behaviour was found to be more stable in adults</li></ul>

Jensen et al. (1994)	Cohort Phase II	<ul style="list-style-type: none"> <li>• Children, adolescents and adults</li> <li>• N=141</li> <li>• Chronic pain patients who participated in inpatient multidisciplinary pain program</li> <li>• 18-65 years old</li> <li>• pain interference with regular activities</li> <li>• excluded: alcohol or substance abuse, surgically remediable causes of pain, comorbid condition that prohibits treatment participation, dementia</li> <li>• LBP, head, neck, leg, shoulder/arm, and other pain</li> </ul>	CSQ and additional strategies (exercise, medication use, keeping busy, relaxation, pain-contingent rest)	assessed over 18 months	than in children and adolescents.
Marhold et al. (2001)	Cohort Phase I	<ul style="list-style-type: none"> <li>• N=94</li> <li>• Chronic pain patients registered on a sick leave registry</li> <li>• 25-60 years old</li> <li>• Musculoskeletal pain diagnosis</li> </ul>	CSQ	<ul style="list-style-type: none"> <li>• Depression</li> <li>• Physical dysfunction</li> <li>• Use of medical services</li> <li>• Sick leave duration</li> <li>• Treatment (Cognitive behavioural return to work)</li> </ul>	<ul style="list-style-type: none"> <li>• After controlling for pre-treatment number of physician visits, decreased use of Helplessness to cope with pain over the three-month period was associated with a decreased number of physician visits (beta=0.34) during that three-month period.</li> <li>• Catastrophizing was significantly reduced for both the treatment and control groups at post-treatment and follow-up. Analyses of variance of the eight scales of</li> </ul>

		<ul style="list-style-type: none"> <li>• Employed</li> <li>• No psychotic illness or planned operations</li> <li>• N=70</li> </ul>		program vs. treatment as usual)	the CSQ did not show any significant interaction effects for either the patients on short-term sick leave or the patients on long-term sick leave. Therefore, coping did not appear to change solely as a result of the treatment
Jensen et al. (2001)	Cohort Phase II	<ul style="list-style-type: none"> <li>• Chronic pain patients of an outpatient multidisciplinary pain program</li> <li>• Reporting pain-related disability</li> <li>• 18 years or older</li> <li>• LBP, neck, shoulder/arm, leg, head, and other pain</li> <li>• Excluded: alcohol/substance abuse, conditions requiring medical intervention or prohibiting participation in treatment program, dementia, major psychopathology</li> <li>• N=141</li> </ul>	CSQ and CPCI	<ul style="list-style-type: none"> <li>• Depression</li> <li>• Physical functioning</li> <li>• Health care use</li> <li>• Pain intensity</li> </ul>	<p>From pre-treatment to post-treatment:</p> <ul style="list-style-type: none"> <li>• An increase in Passive Coping was associated with an increase in disability (beta=0.25).</li> <li>• An increase in Attention to Pain was associated with a decrease in disability (beta=-0.20).</li> <li>• An increase in Catastrophizing was also associated with an increase in depression (beta=0.44).</li> </ul> <p>From pre-treatment to six-month follow-up:</p> <ul style="list-style-type: none"> <li>• An increase in Passive coping was associated with a decrease in disability (beta=-0.29)</li> <li>• Increased Catastrophizing was associated with increases</li> </ul>

in depression ( $\beta=0.48$ ) and pain intensity ( $\beta=0.25$ ). The association between catastrophizing and pain intensity was evident while adjusting for employment status.

From pre-treatment to twelve-month follow-up:

- An increase in Passive Coping was associated with an increase in disability ( $\beta=0.46$ ) and pain intensity ( $\beta=0.20$ ). An increase in Passive Coping was also associated with an increase in disability ( $\beta=0.49$ ), after controlling for pain duration.
  - An increase in Catastrophizing was associated with an increase in depression ( $\beta=0.38$ ).
  - An increase in Active Coping was associated with an increase in pain intensity ( $\beta=0.17$ ).
  - An increase in Attention to Pain was associated with a decrease in health care visits for pain ( $\beta=-0.14$ ).
-

### 2.3.3.1 Cross-sectional Studies

Low Back Pain: One cross-sectional study examined coping behaviour in a sample of low back pain sufferers. Härkäpää (1991) examined coping with low back pain in physical labourers (i.e., individuals engaged in physically strenuous or moderately strenuous work for at least 10 years). Using the Finnish version of the CSQ, Härkäpää examined the independent associations of age, sex, pain severity, psychological distress, and health and back pain locus of control with coping when the other factors were included in the equation. Female gender (OR=1.7, 95%CI=1.1-2.7) and having an internal back pain locus of control (OR=1.6, 95%CI=1.2-2.0) were associated with the coping factor, preventive actions. Female gender (OR= 2.1, 95%CI=1.3-3.2) and having an internal locus of control (OR=1.4, 95%CI=1.1-1.7) were also associated with the use of coping self-statements. Greater psychological distress (OR=1.8, 95%CI= 1.1-3.0) and higher levels of pain severity (OR=1.0, 95%CI=1.0-1.0) were associated with catastrophizing. Female gender (OR=2.9, 95%CI=1.8-4.6) and higher pain severity (OR=1.0, 95%CI=1.0-1.0) were associated with hoping/praying. Female gender was also associated with increased use of diverting attention (OR=1.7, 95%CI=1.1-2.5). Having an “others” locus of control (OR=0.8, 95%CI=0.6-1.0) and an internal back pain locus of control (OR=1.9, 95%CI=1.4-2.4) were associated with increased use of self-care as a coping strategy.

Neck/Shoulder/Low Back Pain: Two cross-sectional studies examined coping in individuals suffering from pain in the shoulder, neck, and/or low back. Jensen, Nygren, Gamberale, Goldie, and Westerholm (1994) examined coping in adults with neck, shoulder, or back pain who had been referred to an orthopedic department. Female gender was associated with greater catastrophizing (beta=2.74) after including

occupation, subjective health status, and pain topography in the multivariate model. In women alone, better subjective health status was also related to more catastrophizing ( $\beta=2.92$ ), after considering occupation and pain topography. In women alone, having a mixed pain area was negatively associated with coping self-statements ( $\beta=-7.29$ ) and ignoring pain sensations ( $\beta=-6.63$ ), when occupation and subjective health status were included in the model. In men alone, the occupation of domestic work was associated with more reinterpreting pain sensations ( $\beta=5.99$ ), after considering subjective health status and pain topography.

Mercado, Carroll, Cassidy, and Côté (2000) examined coping in neck and/or back pain sufferers from the general population. Female gender ( $\beta=0.705$ ), having a higher education level ( $\beta=0.760$ ), fewer depressive symptoms ( $\beta=-0.052$ ), better general health ( $\beta=0.039$ ), and higher exercise frequency ( $\beta = 0.291$ ) was associated with greater levels of active coping, after also including age in the regression equation. Being married ( $\beta=-0.909$ ), having more depressive symptoms ( $\beta=0.102$ ), poorer general health ( $\beta=-0.044$ ), and more severe neck or low back pain (1.846) were associated with greater reliance on passive coping, after also including age and gender in the regression equation.

Rheumatoid Arthritis: One cross-sectional study examined coping in individuals suffering from rheumatoid arthritis. After considering age, gender, education, duration of arthritis complaints, and two measures of pain intensity in the model, use of comforting cognitions was associated with better quality of life ( $r=0.17$ ). Two other regression models found use of comforting cognitions to be associated with less depressed mood ( $r=-0.34$ ) and more cheerful mood, after accounting for those variables described above ( $r=0.35$ ; van Lankveld, van't pad Bosch, van de Putte, Näring, and van

der Staak, 1994). After considering those same variables, decreasing activity was associated with lower quality of life ( $r=-0.23$ ) and less cheerful mood ( $r=-0.24$ ); and coping by diverting attention was associated with better quality of life ( $r=0.14$ ; van Lankveld et al., 1994).

Osteoarthritis: One cross-sectional study examined coping in individuals suffering from osteoarthritis. Hopman-Rock, Kraaijmaat, Odding, and Bijlsma (1998) examined coping in individuals over the age of 55 in the general population who suffered from pain in the hip or knee. After including age, sex, education, marital status, pain chronicity, fatigue intensity, body mass index, radiologic OA, comorbid mobility problems, sport activities, and pain severity in the multivariate model, resting was associated with greater physical disability ( $r=0.32$ ). Reducing demands was not associated with physical disability after including those same variables in a multivariate model ( $r=0.10$ ), despite a crude positive relationship.

Fibromyalgia: One cross-sectional study examined coping with pain in fibromyalgia sufferers. Martin et al. (1996) examined coping in fibromyalgia patients who were attending a clinic. After consideration of age, education, pain duration, disease severity, and neuroticism, greater use of the CSQ factor coping attempts was associated with higher levels of total disability and physical disability, and lower levels of psychosocial disability. In other words, coping attempts accounted for 5% of the variance in total disability, 5% of the variance in physical disability, and 3% of the variance in psychosocial disability. Regression coefficients providing information regarding the strength of the association were not reported by the authors. Catastrophizing was only associated with higher levels of total disability when those factors described above were included in the multivariate model. It accounted for 5% of



the variance in total disability. When neuroticism was not included in the equation, catastrophizing was also associated with greater physical and psychosocial disability.

Headache: Kraaimaat and Van Schevikhoven (1988) examined coping in migraine sufferers of moderate to high severity who were members of a Dutch Migraine Patients Foundation. They calculated zero-order and first-order correlations (adjusting for headache severity) between attribution and coping behaviour. The attribution of the headaches to external physical causes was correlated with greater use of paramedical treatment to cope with pain ( $r=0.13$ ). When headache severity was considered, the attribution of external physical causes was associated with greater use of nonallopathic treatment to cope with pain ( $r=0.16$ ). When accounting for headache severity, the attribution of external physical causes was also associated with greater use of worrying ( $r=0.15$ ) and distraction ( $r=0.13$ ). The attribution of inborn somatic causes was correlated with greater use of medication ( $r=0.15$ ). The attribution of inborn somatic causes ( $r=0.13$ ) was correlated with use of “taking it easier” as a coping strategy. The attribution of inborn somatic causes was also correlated with less use of distraction ( $r=-0.02$ ). The attribution of psychological causes was positively associated with taking it easier ( $r=0.14$ ) and worrying as a coping strategy ( $r=0.15$ ).

Temporomandibular Joint Disorder/Facial Pain: Three cross-sectional studies examined coping with pain in the facial area. Madland, Feinmann, and Newman (2000) explored coping in newly referred facial arthromyalgia patients. When pain intensity and psychological beliefs about pain were included in the multivariate model, catastrophizing was related to more anxious mood ( $\beta=0.427$ ), clinical anxiety ( $OR=1.125$ ), more depressed mood ( $\beta=0.625$ ), and clinical depression ( $OR=1.094$ ).

Turner, Dworkin, Mancl, Huggins, and Truelove (2001) examined coping in patients seeking care at a TMD specialty clinic. After accounting for age, gender, pain intensity, pain beliefs, and other coping scales, catastrophizing was associated with higher levels of depression ( $r=0.60$ ). Zero-order correlations found diverting attention to be associated with greater activity interference ( $r=0.22$ ) and praying/hoping to be associated with greater activity interference ( $r=0.30$ ), more masticatory jaw activities ( $r=0.18$ ), and more non-masticatory jaw activities ( $r=0.25$ ). In addition, coping self-statements was negatively correlated with depression ( $r=-0.29$ ).

Finally, Jaspers, Heuvel, Stegenga, and de Bont (1993) examined coping in TMJ patients. When all other coping subscales were included in the multivariate model, greater expression of emotion was associated with poor psychological health ( $\beta=0.56$ ), more psychosocial distress ( $\beta=0.41$ ), greater activity interference ( $\beta=0.58$ ) and a more negative mood ( $\beta=0.67$ ). When accounting for other coping subscales in the model, wishful thinking was associated with more psychosocial distress ( $\beta=0.44$ ), more intense pain ( $\beta=0.52$ ) and fewer general activities ( $\beta=0.64$ ).

Sickle Cell Disease: Two cross-sectional studies examined coping behaviour in people suffering from sickle cell disease. Gil, Abrams, Phillips, and Keefe (1989) examined coping in adults with sickle cell disease. When age, sex and disease severity were included in the multivariate model, negative thinking/passive adherence was associated with greater severity of pain episodes ( $\beta=0.05$ ). When age, sex, disease severity, and frequency of painful episodes were included in the model, negative thinking/passive adherence was also associated with increased activity reduction ( $\beta=0.53$ ), less “uptime” ( $\beta=-0.11$ ), higher levels of psychological distress ( $\beta=0.01$ ), more ER visits ( $\beta=0.10$ ), and more frequent hospitalizations ( $\beta=0.05$ ).

Coping attempts was associated with less activity reduction ( $\beta=-0.22$ ) when age, sex, disease severity, and frequency of painful episodes were included in the multivariate model.

Gil, Williams, Thompson, and Kinney (1991) also examined coping in children, between the ages of 7 and 17, who were suffering from sickle cell disease. After including age and frequency of painful episodes in the model, coping attempts was associated with lower frequency of ER visits ( $\beta=-0.02$ ) and less household activity reduction ( $\beta=-0.36$ ). When age and frequency of painful episodes were included in the multivariate model, passive adherence was associated with more ER visits ( $\beta=0.03$ ) and greater household (0.56), school (0.56), and social activity reduction (0.54). In addition, negative thinking was associated with more reduction in household activity (0.35) and greater overall levels of psychological distress (0.36), when accounting for age and frequency of painful episodes. The authors also examined coping in the subset of adolescents (13-17 years of age) and found negative thinking was associated with more psychological distress (0.61), after considering frequency of painful episodes.

Burn-related Pain: Ulmer (1997) examined coping in burn injured individuals. Pain intensity ( $r=0.51$ ) and pain distress ( $r=0.42$ ) were found to be correlated with more catastrophizing in this pain population.

Chronic Pain Inpatients: Two cross-sectional studies examined coping in samples of chronic pain patients involved in inpatient treatment programs. Samples from these studies suffered from a variety of pain complaints, including low back pain, headache, leg pain, neck/shoulder/arm pain, cervical pain, etc. Jensen and Karoly (1991) examined coping strategies used by individuals who had participated in an inpatient

multidisciplinary pain program. When pain severity was included in the multivariate model, increasing activities was associated with psychological functioning (i.e., higher life satisfaction and lower levels of depression;  $\beta=0.35$ ). After considering pain severity, ignoring pain was associated with better psychological functioning ( $\beta=0.27$ ). In addition, ignoring pain interacted with pain severity in its association to activity level ( $\beta=-0.55$ ). With lower pain severity, the relationship between ignoring pain and higher activity level was stronger. Coping self-statements was associated with better psychological functioning ( $\beta=0.32$ ) when pain severity was included in the model. It also interacted with pain severity to be associated with activity level ( $\beta=-0.69$ ). Again, with lower pain severity, the relationship between greater use of coping self-statements and higher activity level was stronger. Diverting attention was also associated with higher activity levels, in interaction with pain severity ( $\beta=-0.49$ ).

Jensen, Turner, and Romano (1992) examined coping in chronic pain patients shortly after they were admitted to an inpatient multidisciplinary pain program. When age, gender, duration of pain, pain intensity, and pain site were included in the multivariate model, higher levels of coping attempts was associated with more psychosocial dysfunction ( $\beta=0.19$ ), while helplessness was associated with higher levels of psychosocial dysfunction ( $\beta=0.38$ ) and depression ( $\beta=0.40$ ). After including those factors listed above, reinterpreting pain sensations was associated with greater psychosocial dysfunction ( $\beta=0.23$ ). Coping self-statements interacted with pain intensity, so that it was positively related to physical dysfunction only in medium and high levels of pain intensity, after accounting for the factors identified above. Catastrophizing was related to more psychosocial dysfunction ( $\beta=0.38$ ) and depression ( $\beta=0.54$ ). It also interacted with pain duration, so that it was associated

with more psychosocial dysfunction in patients with short and medium pain duration, when age, gender, duration of pain, pain intensity, and pain site were included in the model.

Chronic Pain: Five cross-sectional studies examined coping in chronic pain patients (Grossi, Soares, Ängeslevä, and Perski, 1999; Grossi, Soares, and Lundberg, 2000; Snow-Turek, Norris, and Tan, 1996; Soares and Grossi, 1999; Turner, Jensen, and Romano, 2000). All samples consisted of individuals suffering from a variety of pain complaints who were seeking some form of care for their pain.

Two of these studies examined catastrophizing. Turner et al. (2000) found catastrophizing to be associated with greater levels of depression ( $\beta=0.56$ ), even after age, gender, pain intensity, pain beliefs, and other coping strategies were included in the multivariate model. Grossi et al. (2000) examined gender differences in coping (Grossi et al., 2000). The association between gender and CSQ coping was not significant when including marital status, occupation, working hours, work strain, emotional distress, pain complexity, perceived disability, use of medication, and mean number of previous treatments in the multivariate model. However, there was an interaction between gender and measures of emotional distress (i.e., post-traumatic stress reaction, self-esteem, anxiety/depression, and burnout) in association with catastrophizing. Women with high levels of emotional distress were more likely to report greater use of catastrophizing. Catastrophizing was also higher in women with greater disability and a history of treatment for pain. In men, none of these variables were significantly associated with catastrophizing.

Two studies examined passive coping. Passive coping (CSQ and PMI) was associated with greater psychological distress ( $\beta=0.46$  and  $0.89$ , respectively) and

depression ( $\beta=0.81$  and  $1.34$ , respectively; Snow-Turek et al., 1996). In immigrants to Sweden, having only mandatory schooling was associated with higher levels of passive coping ( $\beta=-0.36$ ) and having a high school education was associated with lower levels of passive coping ( $\beta=-0.45$ ; Soares and Grossi, 1999). In Swedish natives, occupation (i.e., being in blue-collar ( $\beta=0.40$ ) or low white-collar ( $\beta=0.36$ ) occupations), female gender ( $\beta=0.26$ ), and high financial strain ( $\beta=-0.12$ ) were associated with more passive coping (Soares and Grossi, 1999).

The use of avoidance strategies was only found to be important in one study. After including age, gender, marital status, occupation, foreign background, pain intensity, and diagnosis in the multivariate model, pain avoidance was associated with greater perceived disability ( $\beta=1.26$ ; Grossi et al., 1999). Varying activity to cope with pain was also found to be important in one study. When age, gender, pain intensity, pain beliefs, catastrophizing and other coping strategies were included in the multivariate model, activity reduction was associated with more physical disability ( $\beta=0.42$ ; Turner et al., 2000).

The results for active coping were mixed. After considering age, gender, SES, disability support status, pain duration, and pain severity in the model, active coping, as measured by the CSQ, was associated with more depression ( $\beta=0.03$ ) and with lower activity level ( $\beta=-0.17$ ; Snow-Turek et al., 1996). However, active coping, as measured by the PMI, was associated with greater activity level ( $\beta=1.19$ ; Snow-Turek et al., 1996).

**Summary:** The most often studied coping behaviour in chronic pain sufferers was catastrophizing. Across all pain populations, catastrophizing was associated with indicators of negative adaptation. It was found to be associated with increased pain,

depression, physical impairment and psychological impairment. Therefore, the evidence from the cross-sectional studies consistently identified catastrophizing as a maladaptive pain coping response. Passive coping strategies and praying/hoping were also identified as maladaptive strategies (i.e., they were found to be associated with indicators of poor outcome/adjustment). Other similar strategies that were identified as maladaptive in at least one study included wishful thinking, negative thinking, passive adherence, helplessness, expression of emotion and reinterpreting pain sensations.

Using coping strategies that involve ignoring the pain or distracting oneself from the pain produced mixed results. While some studies found them to be associated with positive outcome, others found them to be associated with negative outcome. Reducing activity level/resting was consistently associated with indicators of poor outcome (e.g., increased physical disability; decreased quality of life). Similarly, increasing activity levels to cope with pain was associated with indicators of positive outcome (e.g., increased life satisfaction; decreased depression). Coping self-statements was associated with less depression. However, its relation to pain and physical dysfunction was inconsistent. Other active strategies (active coping, coping attempts) also displayed inconsistent relationships with indicators of adaptation to pain.

Some demographic variables were found to be associated with coping. Female gender was associated with the increased use of several strategies (coping self-statements, preventive actions, active coping, diverting attention, hoping/praying, and catastrophizing). Higher education level was associated with the use of active coping and lower education was associated with the use of passive coping. Being married was associated with the use of passive coping.

The results from these cross-sectional studies provide some important information about the factors associated with different pain coping strategies. However, the findings are limited by the cross-sectional design of the studies. Results from cross-sectional studies do not allow the formation of conclusions about the direction of the relationships. When two factors are measured concurrently, one cannot make any conclusions about temporal relationships. It is not made clear whether the coping strategy precedes the factor (e.g., depression, physical disability) or is a result of the presence of that factor. Longitudinal (cohort) studies are needed to further delineate the nature of these relationships.

#### 2.3.3.2 Cohort Studies

Low Back Pain: One accepted article that examined coping in low back pain sufferers had a Phase I cohort design (Graver et al., 1995), which is the weakest form of evidence in a longitudinal, prognostic design. It examined coping as a risk factor for clinical outcome in lumbar disc surgery patients. Passive coping was of predictive value for individual terms of the clinical overall score but active coping was not. A review of the factors making up the clinical score indicated that passive coping measured prior to surgery was associated with greater post surgical leg pain ( $r=0.30$ ). Few conclusions can be made on the basis of this evidence, since there was no consideration of the confounding effects of other factors.

Rheumatoid Arthritis: Three studies that examined coping in rheumatoid arthritis sufferers had a cohort design (Brown, Nicassio, and Wallston, 1989; Sharpe et al., 2001; van Lankveld, Näring, van't pad Bosch, and van de Putte, 1999). Sharpe et al. (2001) conducted a Phase I prognostic study that examined coping in people who had been diagnosed with rheumatoid arthritis for less than two years and were attending clinics in



or near London. The authors were interested in the impact of treatment on individuals who had been recently diagnosed with rheumatoid arthritis. Participants were randomly assigned to a cognitive-behavioural group or a standard group (routine medical management). Treatment lasted for eight weeks, and measures were taken at baseline, post-treatment, and 6-month follow-up. Only Reinterpreting Pain was significant at post-treatment when comparing the two groups. The CBT group increased in the use of this strategy in comparison to the standard group over time. Increasing activity showed a main effect for time at both post-treatment and follow-up, indicating an increase in the use of this coping strategy for both groups, at both time periods. Again, this can be considered suggestive only, because of the lack of consideration of the role of other potentially important factors.

The remaining two cohort studies were Phase II prognostic studies, which, although still exploratory, provide somewhat stronger evidence. These two studies used different measures of coping and different outcome variables. Therefore, combining the data was not warranted and a qualitative description of results follows. Brown et al. (1989) examined coping in rheumatoid arthritis sufferers who were patients of outpatient rheumatology practices. They assessed participants at baseline and after a six-month period. When depression at baseline, age, education level, illness duration, functional disability, and medication status variables were included in the multivariate model, passive coping was associated with greater depression six months later. The authors only provided a univariate statistic ( $t(268)=5.09, p<.01$ ) and a semi partial correlation between passive coping and depression ( $sr^2=.015$ ) to describe the strength of the relationship. Passive coping also interacted with pain intensity; depression was more severe at six months when participants engaged in more passive coping during high

levels of pain intensity ( $t(276)=2.83$ ,  $sr^2=.025$ ). Active coping was associated with less depression at six months, after including depression at baseline, age, education level, illness duration, functional disability, and medication status variables in the model ( $t(278)=-4.84$ ,  $sr^2=.017$ ).

van Lankveld et al. (1999) also examined coping in rheumatoid arthritis patients of outpatient departments. In this study, the follow-up period was one year. After including dexterity at baseline, impairment at baseline, and disease activity and pain at both baseline and follow-up in the multivariate model, the use of the coping strategy decreasing activity at baseline was associated with less dexterity at one-year follow-up ( $\beta=-0.34$ ).

Sickle Cell Disease: Three cohort studies examined coping in individuals with sickle cell disease (Gil, Abrams, Phillips, and Williams, 1992; Gil et al., 1993; Gil, Wilson, and Edens, 1997). The two studies examining the relationship between coping and outcome were Phase II prognostic studies. Although these two studies used the same measures, the factors identified and used in analysis were different across the two samples. The samples also differed in age range. As a result, it did not appear as though combining the data across these two samples would provide much more information than that available through qualitative description. The first study (Gil et al., 1992) used a sample of adult SCD patients and followed them over a nine-month period. When age, gender, phenotype, number of complications and frequency of painful episodes were included in the multivariate model, the coping factor of negative thinking/passive adherence at baseline was associated with more frequent ( $\beta=0.02$ ) and longer hospitalizations ( $\beta=0.04$ ), less “uptime” ( $\beta=0.05$ ) and higher percentages of household ( $\beta=0.39$ ), work ( $\beta=0.39$ ), and social activity reduction ( $\beta=0.31$ ) over

the follow-up period. After including those same factors in the model, coping attempts at baseline was associated with lower household activity reduction over the follow-up period ( $\beta = -0.15$ ).

A second study (Gil et al., 1993) examined coping in a sample of children who were suffering from sickle cell disease. They also followed their sample for nine months. After including age and frequency of painful episodes in the model, passive adherence was associated with more frequent contact with health care providers ( $\beta = 0.05$ ). Coping attempts was associated with less school ( $\beta = -0.55$ ), household ( $\beta = -0.30$ ), and social activity reduction ( $\beta = -0.31$ ) and higher levels of “uptime” ( $\beta = 0.06$ ), when age and frequency of painful episodes were included in the multivariate model.

The third cohort study (Gil et al., 1997) examined coping in children, adolescents, and adults with sickle cell disease. Their focus was to examine coping over an 18-month period and assess its stability. They did not examine any factors associated with coping behaviour. The result of this study suggests that coping in adults is relatively stable. In adolescents and children, the use of coping strategies was more variable over time.

In people diagnosed with Sickle Cell Disease, negative thinking and passive adherence were found to be associated with poor outcome, while coping attempts was associated with a more positive outcome. These associations were found in both adults and children.

Chronic Pain Inpatients: One Phase II cohort study examined coping in chronic pain sufferers recently admitted to an inpatient multidisciplinary pain program (Jensen, Turner, and Romano, 1994). The treatment program was three weeks long and consisted

of a variety of interventions, including group pain education and coping skills training. Participants were assessed at pre-treatment and three months after discharge. When pre-treatment number of physician visits was included in the model, decreased use of helplessness to cope with pain over the three-month period was associated with a decreased number of physician visits during that three-month period ( $\beta=0.34$ ).

Chronic Pain Other: Two cohort studies examined coping in chronic pain patients with samples composed of mixed pain types (Jensen, Turner, and Romano, 2001; Marhold, Linton, and Melin, 2001). Jensen et al. (2001) conducted a Phase II cohort study that examined coping in chronic pain patients who participated in an outpatient multidisciplinary pain program. The pain program lasted three weeks and measures were taken at the beginning of treatment, after treatment and at six and twelve-month follow-up. Change scores were calculated for the coping variables between pre-treatment and all three follow-up measures. All multivariate regression equations included changes in beliefs about pain and changes in other coping strategies. From pre-treatment to post-treatment, an increase in passive coping was associated with an increase in disability ( $\beta=0.25$ ) and an increase in attention to pain was associated with a decrease in disability ( $\beta=-0.20$ ). In this period, an increase in catastrophizing was also associated with an increase in depression ( $\beta=0.44$ ). From pre-treatment to six-month follow-up, an increase in passive coping was associated with a decrease in disability ( $\beta=-0.29$ ), which is inconsistent with the relationships found between these two variables in the period from pre- to post-treatment and from pre-treatment to 12-month follow-up. Consistent with the other periods, however, an increase in catastrophizing was associated with increases in depression ( $\beta=0.48$ ) and pain intensity ( $\beta=0.25$ ). The association between catastrophizing and pain intensity was

evident even when employment status was included in the model. From pre-treatment to twelve-month follow-up, an increase in passive coping was associated with increases in disability ( $\beta=0.46$ ) and pain intensity ( $\beta=0.20$ ). An increase in passive coping was also associated with an increase in disability ( $\beta=0.49$ ), after controlling for pain duration. During this period, an increase in catastrophizing was associated with an increase in depression ( $\beta=0.38$ ), an increase in active coping was associated with an increase in pain intensity ( $\beta=0.17$ ), and an increase in attention to pain was associated with a decrease in health care visits for pain ( $\beta=-0.14$ ).

Marhold et al. (2001) conducted a Phase I cohort study that examined coping in employed women on sick leave. Participants were randomly assigned to either a cognitive-behavioural return to work program or a treatment as usual group. They were also divided into groups based on length of sick leave (long term sick leave [more than 12 months] and short term sick leave [2-6 months]). The cognitive-behavioural program consisted of twelve weekly sessions and two booster sessions. Measures were taken at pre-treatment, post-treatment, and six months after the program. Catastrophizing was significantly reduced for both the treatment and control groups at post-treatment and follow-up. Analyses of variance of the eight scales of the CSQ did not show any significant interaction effects for either the patients on short-term sick leave or the patients on long-term sick leave. Therefore, coping did not appear to change solely as a result of the treatment.

Summary: The results of these cohort studies provide us with important information about the temporal relationship between coping behaviours and various outcome measures. Unlike cross-sectional studies, they allow us to draw some conclusions about the direction of relationships. In these longitudinal studies, active

coping strategies continued to be inconsistent, being associated with lower levels of depression but higher levels of pain intensity. This inconsistency may have been due to a difference in pain population (RA vs. mixed chronic pain group) or coping measure (PMI vs. CSQ & CPCI). Coping attempts was associated with less activity reduction in sickle cell pain patients. Decreasing activity was associated with decreased dexterity in RA patients.

The results of the cohort studies confirm the maladaptive nature of catastrophizing and passive coping. These responses to pain were found to be associated with increased disability, pain, depression and health care use up to a year later. Decreases in catastrophizing and passive coping were also found to be associated with improvement in adjustment measures.

Only two treatment studies were described. Their findings were inconsistent across populations. In RA sufferers, reinterpreting pain sensations was the only strategy affected by treatment (resulting in its increased use) while the use of increasing activity increased for both CBT and control groups. In a mixed pain population, catastrophizing was influenced by CBT and usual treatment.

## 2.4 Discussion

There is a large and varied literature regarding coping behaviour in pain sufferers. However, few studies meet the standards for high quality, methodologically sound research. Twenty cross-sectional studies provide important information about the relationships between coping strategies and measures of adjustment/outcome or demographic data. These studies are limited by their cross-sectional design but, nevertheless, provide some indication of the existing state of the literature on coping with pain.

The results from these studies suggest female gender is associated with the increased use of various strategies, both active (coping self-statements, preventive actions, diverting attention, active coping) and passive (catastrophizing, hoping/praying) in nature. Education level was associated with greater active coping and less use of passive coping strategies. Finally, being married was associated with the increased use of passive coping.

The coping strategies of catastrophizing, passive coping, praying/hoping, wishful thinking, negative thinking/passive adherence, helplessness, expression of emotion, reducing activity levels, and reinterpreting pain sensations were all found to be associated with indicators of poor adjustment, such as depression, pain, and disability. With the exception of reinterpreting pain sensations, all of these strategies can be classified as passive in nature. In other words, they represent behaviours that allow the pain to adversely affect other areas of their lives or give control of pain management to an outside source (Brown & Nicassio, 1987). This finding (i.e., the relationship between passive strategies and maladaptive outcome) has been consistent across accepted and rejected studies and across pain populations, speaking to the consistency and strength of this relationship.

The results regarding active strategies were more inconsistent in the cross-sectional studies. Increasing activity levels and coping self-statements were generally associated with indices of positive outcome. Distraction and ignoring pain were associated with mixed findings, including higher levels of psychological functioning and activity along with higher levels of disability. Active coping and coping attempts were also inconsistent in their relationship to adjustment variables. This inconsistency may be a result of the different pain populations studied, as well as the varied nature of actual

behaviours contained in those scales. In addition, few studies used the same outcome measures. Different active coping strategies may be associated with different facets of adjustment.

Overall, the results of the cross-sectional studies suggest that passive coping strategies are consistently associated with negative outcome while more active strategies are inconsistent. These results are limited, however, in that they do not allow conclusions regarding the direction of the relationships between coping and these variables.

Ten longitudinal studies were rated as acceptable. Two studies examined the effect of treatment on coping strategy use. Cognitive-behavioural therapy was found to affect only the use of reinterpreting pain sensations, resulting in its increased use. Unfortunately, the use of reinterpreting pain sensations was found to be maladaptive in another cross-sectional study! Increasing activity levels and catastrophizing were both found to change over time, but not as a function of treatment. Another longitudinal study examined the stability of coping in people with sickle cell disease. This study found coping to be more stable in adults, with decreased stability of coping strategies in children and adolescents.

The remaining seven studies examined the ability of coping measured at baseline to predict subsequent measures of adjustment. The results of these studies suggest that the use of passive strategies (catastrophizing, passive coping, helplessness, negative thinking/passive adherence, and decreasing activity) is predictive of negative outcome (depression, pain, disability), confirming the results of the cross-sectional studies.

Similar to those cross-sectional results, active strategies continued to have no consistent relationship with positive versus negative indices of outcome. Several studies



found no relationships between the active strategies and outcome measures. The few studies that found relationships found coping attempts to be associated with less activity reduction in sickle-cell patients and active coping to be associated with less depression in RA patients and more pain intensity in a mixed chronic pain sample. Findings varied across pain populations and measures of coping. None of the studies that found relationships between active coping strategies and adjustment variables used more specific measures of active strategies (e.g., coping self-statements, ignoring pain, distraction, etc.). In addition, there was little consistency in outcome measures studied. Further study of the relationship between specific active coping strategies and different facets of adjustment may identify some more consistent relationships. As stated previously, different active coping strategies may be associated with different facets of adjustment.

Clearly, the results of these studies point to the maladaptive nature of passive coping strategies and the inconsistency of active coping strategies. More high quality, longitudinal research is needed to examine these relationships further. Particular consideration of the distinct pain groups and further delineation of these relationships within those groups may be beneficial. They may be particularly helpful in sorting out the nature of the relationships for more active strategies. Further study of the measures of active coping strategies may also be beneficial in exploring its relationship to adjustment.

These findings can provide some guidance for rehabilitation programs serving pain sufferers. The mandate of many of these programs appears to be the promotion of an active approach to dealing with the pain. However, these results suggest that passive coping strategies are a stronger marker for negative outcome than active coping

strategies are for positive outcome. As such, further inclusion of these passive strategies as a focus of these programs and further exploration of the impact of changes in passive coping on overall adjustment may be more beneficial in treatment programs. In addition, passive coping strategies can be used as markers for those at risk and in need of more aggressive interventions.

It must be noted that the present literature review has several limitations. First, only published studies were considered for review. Second, only two databases (Medline and PsycLIT/PsycINFO) were searched for abstracts. There may be unpublished studies or studies in non-indexed journals that would add important information to the literature. The presence of only one reviewer may have also caused some bias in the selection and ratings of studies. However, all attempts were made to follow guidelines stringently in order to minimize bias.

Despite these limitations, the current review does provide an overview of the existing state of the literature on coping with pain. The studies do point to the conclusion that the use of passive strategies, such as catastrophizing and reducing activity levels, are predictive of poor outcome/adjustment, whereas the relationship between the use of active strategies and outcome/adjustment is inconsistent and continues to require further delineation.

### **3. STUDY 2: Systematic Review of the Risk/Prognostic Factors for LBP**

### 3.1 Introduction

The low back pain literature is vast and growing. Many of these studies have addressed risk/prognostic factors for low back pain in the general population. However, the results have often been contradictory, providing little information regarding the factors that can validly be accepted as significant risk or prognostic factors for LBP. In order to draw generalizations from the scientifically acceptable literature in this area and to obtain an understanding of the valid risk/prognostic factors for LBP, a systematic literature review was needed.

In addition, in order to fully examine the relationship between coping and outcome in low back pain sufferers, it was important to build models that controlled for the confounding effects of risk and prognostic factors. A systematic review of this literature was able to identify potentially important risk/prognostic factors and guided the coping analysis in the empirical portion of this project.

Therefore, the purpose of this study was to identify important risk/prognostic factors for low back pain in the general population. The primary purpose was to use this information in the analyses examining the relationship between coping and outcome of individuals with neck or low back pain. It also served to bring some clarity to the vast and confusing literature regarding the risk/prognostic factors for low back pain.

### 3.2 Methodology

A systematic search of the Medline database was conducted to assemble all potentially relevant English-language articles published between 1980 and 2001. An initial search was conducted in January 1998. The search was repeated in January 2002 to capture any new articles published to the end of 2001. The free text term of Low Back Pain was used and limited with the following terms: determinants, risk factors,

follow-up studies, prognosis, prospective studies, epidemiology, cohort studies, longitudinal studies, retrospective studies, prevalence, incident, case-control studies, and causality. The search was limited to studies that were written in English and used human participants. The literature was further limited to include only those studies that were population-based. Abstracts were rated for their relevance and all relevant articles were collected for review.

Abstracts were rated as relevant if the paper: 1) contained data, 2) was in English, and 3) examined the risk or prognostic factors of low-back pain. Articles were excluded (i.e., rated as irrelevant) if they 1) did not contain data, 2) were in a foreign language, 3) used non-human participants, and 4) used samples that were not population-based (i.e., occupational samples, clinical samples). Those abstracts that did not contain enough information for a rating were rated as unknown and the articles were reviewed for relevance. All relevant articles were read and assessed for scientific merit. This assessment was conducted using the same forms described in Study 1. Studies were further limited to those with a prognostic design. Studies that were considered to be scientifically admissible were included in the final review. The results of all accepted papers were summarized.

### 3.3 Results

#### 3.3.1 Search Results

The Medline search yielded a total of 1802 abstracts. A review of the abstracts identified 439 articles as relevant to the study of risk/prognostic factors of low back pain. Of those 439 articles, 131 studies were identified as using a population-based sample. Only the 131 articles that were identified as population-based were eligible for review. In addition, 21 articles were identified as relevant through a hand-search of

existing files. Thus, a total of 152 articles were eligible for review. Of the 152 articles that were read, 23 were subsequently excluded because they did not meet the inclusion criteria for the present review. Thus, 129 articles were admissible for review. At this point, articles were limited to studies with a prospective cohort design. Only longitudinal studies were included because this is the only study design that allows for the study of the temporal relationship between an identified factor and the future occurrence of low back pain (incidence, recurrence, or disability).

Limiting studies to only those with a longitudinal design resulted in 50 articles (Appendix C) that were included for review. Of these 50 articles, 20 were judged to be scientifically admissible. These 20 articles described only nine separate studies. Table 3.1 summarizes the results of the search. One of these accepted studies examined risk/prognostic factors of LBP in a sample composed of older individuals. Three studies (four articles) used samples composed of schoolchildren and adolescents. The remaining five studies (fifteen articles) used adult samples from the general population. Two of the accepted articles described Phase I prognostic studies. These articles provide information about crude, unadjusted relationships between the potential risk/prognostic factor and LBP. Fifteen of the articles described Phase II prognostic studies. These studies provide stronger evidence for the relationship between a risk/prognostic factor

Table 3.1 Summary of Literature Search Results for Risk/Prognostic Factors of LBP

Search	Rating		Total
	Relevant/Reviewed	Irrelevant	
Original (1980-1997)	30	1109	1139
New (1998-2001)	20	643	663
Total	50	1752	1802

and LBP because they present information about the predictive ability of these factors when adjusting for other important variables (i.e., multivariate analyses). Three articles described phase III prognostic studies. These studies provide the strongest evidence for risk/prognostic factors. The study designs, according to sample, are summarized in Table 3.2. A summary of the study designs, study samples, factors under study, and outcome variables are presented in Table 3.3 and 3.4. To summarize the results, the studies were classified according to factor studied and outcome. Within the outcome groups, studies were further categorized according to study type and age of sample. Brief summaries of the results of all accepted studies that assessed risk factors are presented in Table 3.3. Results of all accepted studies that assessed prognostic factors are presented in Table 3.4. The limited number of studies and numerous variables under study precluded a statistical integration of results. Therefore, a qualitative summary of the study results is presented.

### 3.3.1 Risk Factors

The following studies examined the potential risk factors for LBP. Risk factors for the onset of low back pain, the recurrence of low back pain, and being sick-listed as a result of low back pain were examined.

#### 3.3.2.1 LBP Onset

Ten articles described the examination of risk factors for the onset of LBP. Seven articles were Phase II studies and three articles were phase III studies (Altman & Lyman, 1998). Three articles (two studies) examined risk factors in children and adolescents, six articles (four studies) examined risk factors in adults from the general population, and one study examined risk factors for LBP in older adults.

Table 3.2 Summary of Study Designs of Accepted Articles

Population	Accepted			
	Phase I	Phase II	Phase III	Total
Older Individuals	0	1	0	1
Children/Adolescents	1	2	1	4
General Population/Adults	2	11	2	15
Total	3	14	3	20

Two accepted Phase II studies examined the risk factors for the incidence of LBP in children/adolescents. Nissinen, Heliövaara, Seitsamo, Alaranta, and Poussa (1994) examined risk factors for the incidence of LBP over a 12-month period using a sample of fourth grade schoolchildren. Sitting height (OR=1.24, 95%CI=1.03-1.46) and large hump size (i.e., large maximum vertical distance of the rib hump or lumbar prominence on gradual forward bending; OR=1.19, 95%CI=1.00-1.39) were predictive of the incidence of low back pain three years later after adjusting for body mass index, growth of body mass index, kyphosis and increase of kyphosis. Feldman, Shrier, Rossignol, and Abenham (2001) examined the risk factors for LBP incidence in students in grades seven to nine in three schools. They examined the risk factors for developing LBP in two six-month periods. In the first six months, decreased quadriceps flexibility (OR=1.04, 95%CI=1.00-1.08) and working (OR=1.22, 95%CI=1.03-1.71) were associated with the development of LBP. In the second six-months, a high growth spurt (OR=5.49, 95%CI=1.55-19.47) and smoking (OR=3.15, 95%CI=1.20-8.27) were associated with the development of LBP. The authors also examined the impact of the type of work that the adolescent engaged in on developing low back pain. Work activity was categorized as white collar, blue collar, or childcare. Definitions for these categories were not provided. Working in a white-collar position (OR=4.85,



95%CI=1.66-14.19) was associated with the development of LBP. General estimating equation analyses found a high growth spurt (OR=3.09, 95%CI=1.53-6.01), decreased quadriceps (OR=1.02, 95%CI=1.00-1.05) and hamstring flexibility (OR=1.04, 95%CI=1.01-1.06), smoking (OR=2.20, 95%CI=1.38-3.50), and low mental health status (which was measured concurrently with outcome; OR=0.98, 95%CI=0.97-0.99) to be associated with the development of LBP. Given the concurrent assessment of mental health status, the temporal relationship between this and LBP is unclear.

Feldman, Rossignol, Shrier, and Abenhaim (1999) focused on the role of smoking in the development of LBP in the same sample of individuals in grades seven to nine. Their study incorporated a phase III risk study design. Smoking was found to be associated with incident LBP at six (OR=2.39, 95%CI=1.08-5.27) and twelve-month (OR=2.49, 95%CI=1.02-6.01) follow-up, after controlling for age, gender, time-varying growth spurt, flexibility, trunk muscle strength, activity participation (work and sports), and mental health status. A generalized estimating equation analysis also found this relationship between smoking and LBP (OR=2.43, 95%CI=1.26-5.96). When they divided smoking into three categories (non-smoker, light to moderate smoker and moderate to heavy smoker), they found a dose-response relationship between the amount smoked and the risk of developing LBP after adjusting for those same variables. Compared to non-smoker, the risk of developing LBP for light to moderate smokers was 2.28 (95%CI=1.15-4.51) while the risk for moderate to heavy smokers was 3.78 (0.82-17.51).

Table 3.3 Summary of Accepted Articles Studying Risk Factors: Sample Characteristics, Factors Studied, Outcome & Results

Author	Study Design	Sample	Risk Factors Studied	Outcome	Results
Burton et al. (1996)	Phase I	<ul style="list-style-type: none"> <li>• School children</li> <li>• N=147</li> </ul>	<ul style="list-style-type: none"> <li>• Age</li> <li>• Gender</li> <li>• Sports exposure</li> <li>• Lumbar sagittal flexibility</li> </ul>	LBP “ever had back pain in the back, other than occasional twinges, in the past year”	<p>Lifetime prevalence of LBP rose steadily at 10% annually over the 10 years.</p> <p>Higher prevalence of LBP in boys.</p> <p>After age 13, lifetime prevalence was higher for those doing more than school sports.</p> <p>Stepwise regression found that average sports exposure was a significant predictor of prevalence of LBP by age 15 years for boys only.</p>
Nissinen et al. (1994)	Phase II	<ul style="list-style-type: none"> <li>• 4<sup>th</sup> grade school children</li> <li>• children who experienced LBP more than 1 year before baseline were excluded</li> <li>• N=859</li> </ul>	<ul style="list-style-type: none"> <li>• Hump size</li> <li>• Flexibility</li> <li>• Height</li> <li>• Weight</li> <li>• BMI</li> <li>• Gender</li> <li>• Leg length inequality</li> <li>• Sagittal spinal profile</li> </ul>	LBP “ever had back pain in your lower back”	<p>Sitting height (OR=1.24, 95%CI=1.03-1.46) and large hump size (OR=1.19, 95%CI=1.00-1.39) were associated with LBP 3 years later.</p>
Feldman et al. (2001)	Phase II	<ul style="list-style-type: none"> <li>• Students (grade7-9)</li> <li>• No LBP in past 6</li> </ul>	<ul style="list-style-type: none"> <li>• Growth spurt</li> <li>• Muscular</li> </ul>	LBP at least once/week	Decreased hamstring strength (OR=1.04, 95%CI=1.01-1.06)

		<ul style="list-style-type: none"> <li>months</li> <li>N=502</li> </ul>	<ul style="list-style-type: none"> <li>flexibility</li> <li>Abdominal strength</li> <li>Level of physical activity</li> <li>Work status</li> <li>Age</li> <li>Gender</li> <li>Height</li> <li>Weight</li> <li>Mental health</li> <li>Smoking</li> <li>Smoking status</li> <li>Amount smoked</li> </ul>	<p>within the past 6 months</p> <p>LBP at least once/week within the past 6 months</p>	<p>and quadriceps flexibility (OR=1.02, 95%CI=1.00-1.05), high growth spurt (OR=3.09, 95%CI=1.53-6.01), smoking (OR=2.20, 95%CI=1.38-3.50), and low mental health status (OR=0.98, 95%CI=0.97-0.99) were associated with the development of LBP.</p> <p>Smoking was associated with LBP (OR=2.43, 95%CI=1.26-5.96), after controlling for age, gender, time-varying growth spurt, flexibility, trunk muscle strength, activity participation (work and sports), and mental health status.</p> <p>A dose-response relationship was found between the amount smoked and the risk of developing LBP. Compared to non-smoker, the risk of developing LBP for light to moderate smokers was 2.28 (95%CI=1.15-4.51) while the risk for moderate to heavy smokers was 3.78 (0.82-17.51).</p>
Feldman et al., (1999)	Phase III	<ul style="list-style-type: none"> <li>Students (grade7-9)</li> <li>No LBP in past 6 months</li> <li>N=502</li> </ul>			

Biering-Sørensen (1983)	Phase I	<ul style="list-style-type: none"> <li>• General population</li> <li>• 30, 40, 50, &amp; 60 year olds</li> <li>• N=442 men &amp; 478 women</li> <li>• 281 men &amp; 294 women had previous LBP</li> </ul>	<ul style="list-style-type: none"> <li>• Age</li> <li>• Gender</li> <li>• Time since last LBP episode</li> <li>• Frequency of LBP</li> <li>• Days with LBP</li> <li>• Cause</li> <li>• Onset progress</li> </ul>	LBP onset during follow-up year or LBP recurrence	Older age in women, more frequent LBP in the past, gradual onset of LBP, and aggravated course of LBP was predictive of LBP in the follow-up year. No factors reportedly associated with onset.
Biering-Sørensen (1984)	Phase I	<ul style="list-style-type: none"> <li>• General population</li> <li>• 30, 40, 50, &amp; 60 year olds</li> <li>• N=442 men &amp; 478 women</li> <li>• 281 men &amp; 294 women had previous LBP</li> </ul>	<ul style="list-style-type: none"> <li>• Body height</li> <li>• Weight</li> <li>• Maximal isometric strength</li> <li>• Leg length discrepancy</li> <li>• Flexibility</li> <li>• Spinal flexion</li> <li>• Trunk muscle strength</li> <li>• Leg strength</li> <li>• Hamstring muscle strength</li> <li>• Isometric endurance of back muscles</li> <li>• Femoral epicondylar width, upper body length</li> <li>• Time since last</li> </ul>	LBP onset during follow-up year or LBP recurrence	<p>LBP Onset: Men: predicted by age (direction not reported), lower spinal flexion and shorter isometric back muscle endurance. Women: predicted by age (younger), less MVC at backward pull, and longer endurance time.</p> <p>LBP Recurrence: Men: predicted by fewer number of weeks since last LBP episode. Women: predicted by less MVC at forward flexion and fewer number of weeks since last LBP episode.</p>

Biering-Sørensen & Thomsen (1986)	Phase II	<ul style="list-style-type: none"> <li>• General population</li> <li>• 30, 40, 50, &amp; 60 year olds</li> <li>• N=442 men &amp; 478 women</li> <li>• 281 men &amp; 294 women had previous LBP</li> </ul>	<p>LBP episode</p> <ul style="list-style-type: none"> <li>• Comorbid medical conditions</li> <li>• General health</li> <li>• Smoking</li> <li>• Occupational conditions</li> <li>• Social and leisure variables</li> <li>• Working conditions</li> <li>• Intake of stimulants</li> <li>• Health services contact</li> </ul>	LBP onset during follow-up year or LBP recurrence	<p>LBP onset: The presence of epigastric pain, previous hospitalizations, previous operations, daily smoking, and greater distance from home to work were associated with LBP onset.</p> <p>LBP recurrence: Men: Pain in the lower limbs, headache, and living alone were associated with LBP recurrence. Women: The presence of rumbling of the stomach and feeling fatigued were associated with LBP recurrence.</p>
Biering-Sørensen et al. (1989)	Phase II	<ul style="list-style-type: none"> <li>• General population</li> <li>• 30, 40, 50, &amp; 60 year olds</li> <li>• N=442 men &amp; 478 women</li> <li>• 281 men &amp; 294 women had previous LBP</li> </ul>	<ul style="list-style-type: none"> <li>• Low back history variables</li> <li>• Physical measurements</li> <li>• Other medical, social, and occupational history variables</li> </ul>	LBP onset during follow-up year or LBP recurrence	<p>LBP onset: The presence of epigastric pain, more hospitalizations, daily smoking, greater distance from home to work, and shorter isometric back endurance were associated with LBP onset during the follow-up year.</p> <p>LBP recurrence: Men: Unchanged course of LBP since onset, greater frequency of LBP, the presence of sciatica, and living alone were associated with LBP recurrence.</p>

Muller et al (1999)	Phase II	<ul style="list-style-type: none"> <li>• General population</li> <li>• 30, 40, 50, &amp; 60 year olds</li> <li>• Excluded if granted disability prior to baseline</li> <li>• N=538 men and 467 women</li> </ul>	<ul style="list-style-type: none"> <li>• Age</li> <li>• Gender</li> <li>• LBP-related variables</li> <li>• Working conditions</li> <li>• Physical objective measures</li> <li>• Self-rated health</li> <li>• Smoking</li> <li>• Health factors</li> <li>• Exercise/sports</li> </ul>	Sick listing due to LBP in past year and in past 7 years	<p>Women: Shorter time since last LBP episode, waking at night due to LBP, no influence of standing on LBP, rumbling of stomach, and daily smoking were associated with LBP recurrence.</p> <p>Previous sciatic pain (OR=3.78, 95%CI=1.77-8.06), sick-listing in general (i.e., due to illness other than LBP; compared to those with no weeks of sick-listing, those who were sick listed for 1-2 weeks had an OR=2.24 [95%CI=1.09-4.58] and those who were sick-listed for 5 weeks or more had an OR=4.93 [95%CI=1.85-13.14]), greater use of analgesics (OR=2.57, 95%CI=1.24-5.36), younger age (compared to 50 year olds, those who were 30 had an OR=2.67 [95%CI=1.6-6.15] and those who were 40 had an OR=2.80 [95%CI=1.16-6.76]), occupation (compared to white-collar workers, self-employed individuals had an OR=3.11 [1.00-9.64] and unskilled workers had an OR=3.50 [1.63-7.54] and results on the trunk-raising test</p>
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Croft et al. (1996)	Phase II	<ul style="list-style-type: none"> <li>• General population</li> <li>• 18-75 years old</li> <li>• registered with 2 general practices in the region</li> <li>• free of LBP during the baseline period (1 month)</li> <li>• N=2715</li> </ul>	<ul style="list-style-type: none"> <li>• Age</li> <li>• Gender</li> <li>• Employment status</li> <li>• Smoking</li> <li>• Social class</li> <li>• Psychological distress</li> <li>• Self-perceived overall health</li> </ul>	LBP episode (lasting more than 1 day) leading to consultation or LBP episode not leading to consultation	<p>(compared to those with 100%, those with 60-80% had an OR=0.41 [0.17-1.00] and those with 50% had an OR=2.40 [0.74-7.77]) were associated with sick listing due to LBP in the past year.</p> <p>Age (OR=2.05, 95%CI=1.22-3.43 for 30 year olds, and OR=2.09, 95%CI=1.21-3.60 for 40 year olds), previous sick listing due to LBP (OR=3.25, 95%CI=1.92-5.48), sick listing in general (OR=1.86, 95%CI=1.15-3.01 for 1-2 weeks and OR=2.59, 95%CI=1.16-5.74 for 5 weeks or more), and use of analgesics (OR=2.45, 95%CI=1.46-4.10) were predictive of sick listing due to LBP in the past 7 years.</p> <p>Greater psychological distress (OR=1.78, 95%CI=1.08-2.96) was associated with LBP leading to consultation.</p> <p>Age (compared to 18-29 year olds, 60-75 year old individuals had an OR of 0.69 [95%CI=0.49-0.96]), lower social class (i.e., not owning a car; OR=0.64, 95%CI=0.51-0.82), fair</p>
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Papageorgiou et al. (1996)	Phase II	<ul style="list-style-type: none"> <li>• General population</li> <li>• 18-75 years old</li> <li>• registered with 2 general practices in the region</li> <li>• free of LBP during the baseline period (1 month)</li> <li>• N=2715</li> </ul>	<ul style="list-style-type: none"> <li>• History of previous back pain</li> <li>• Current pain at other musculoskeletal sites</li> <li>• Psychological distress</li> <li>• Physical activity at work and leisure</li> <li>• Lifestyle variables</li> </ul>	LBP episode (lasting more than 1 day) leading to consultation or LBP episode not leading to consultation	<p>(OR=1.59, 95%CI=1.09-2.33) or poor (OR=2.24, 95%CI=1.17-4.31) poor health rating, and greater psychological distress (OR=1.65, 95%CI=1.22-2.21) were associated with LBP not leading to consultation.</p> <p>Men: Current pain in other parts of the body (OR=2.7, 95%CI=1.3-5.8) and history of previous LBP (OR=4.48, 95%CI=3.3-7.1) were associated with LBP leading to consultation. Current neck pain was associated with LBP not leading to consultation (OR=2.4, 95%CI=1.5-3.8).</p> <p>Women: History of previous LBP (OR=2.9, 95%CI=1.7-5.1 for consulting LBP and OR=2.2, 95%CI=1.6-3.0 for non-consulting LBP), current neck pain (OR=2.5, 95%CI=1.3-4.7 for consulting LBP and OR=1.9, 95%CI=1.3-2.7), and other musculoskeletal pain (OR=1.8, 95%CI=1.0-3.4 for consulting LBP and OR=1.9, 95%CI=1.3-2.7 for non-consulting LBP),</p>
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Papageorgiou et al. (1997)	Phase II	<ul style="list-style-type: none"> <li>• General population</li> <li>• 18-75 years old</li> <li>• registered with 2 general practices in the region</li> <li>• free of LBP during the baseline period (1 month)</li> <li>• employed</li> <li>• N=1412</li> </ul>	<ul style="list-style-type: none"> <li>• Age</li> <li>• Gender</li> <li>• Social class</li> <li>• Psychological distress</li> <li>• Psychosocial aspects of current employment</li> </ul>	LBP episode (lasting more than 1 day) leading to consultation or LBP episode not leading to consultation	<p>were associated with LBP.</p> <p>Dissatisfaction with employment status (OR=1.8, 95%CI=1.0-3.1), perceived severe inadequacy of income (OR=3.6, 95%CI=1.8-7.2), and lower social class in women (OR=7.7, 95%CI=2.1-27.8) were predictive of LBP leading to consultation.</p> <p>Dissatisfaction with employment status (slight dissatisfaction: OR=1.7, 95%CI=1.2-2.4; severe dissatisfaction: OR=2.0, 95%CI=1.2-3.3) was predictive of LBP not leading to consultation.</p>
Papageorgiou et al. (1998)	Phase II	<ul style="list-style-type: none"> <li>• General population</li> <li>• 18-75 years old</li> <li>• registered with 2 general practices in the region</li> <li>• free of LBP during the baseline period (1 month)</li> <li>• employment status available</li> <li>• N=1668</li> </ul>	<ul style="list-style-type: none"> <li>• Age</li> <li>• Gender</li> <li>• Social class</li> <li>• Psychological distress</li> <li>• Psychosocial aspects of current employment</li> </ul>	LBP episode (lasting more than 1 day) leading to consultation or LBP episode not leading to consultation	<p>Being slightly or severely dissatisfied with employment status was associated with non-consulting LBP in both employed (slight dissatisfaction: OR=1.7, 95%CI=1.2, 2.4; severe dissatisfaction: OR=2.0, 95%CI=1.2-3.3) and non-employed (slight dissatisfaction: OR=1.6, 95%CI=1.1-2.4; severe dissatisfaction: OR=2.0, 95%CI=1.2-3.1) individuals after adjusting for age and gender.</p> <p>Perceived inadequacy of income</p>

Croft et al. (1999)	Phase II	<ul style="list-style-type: none"> <li>• General population</li> <li>• 18-75 years old</li> <li>• registered with 2 general practices in the region</li> <li>• free of LBP during the baseline period (1 month)</li> <li>• N=2715</li> </ul>	<ul style="list-style-type: none"> <li>• Physical activity</li> <li>• Height</li> <li>• Weight</li> <li>• Non-occupational physical activity</li> <li>• Smoking</li> </ul>	LBP episode (lasting more than 1 day) leading to consultation or LBP episode not leading to consultation	<p>(Employed: [OR=3.6, 95%CI=1.8-7.2]; Non-employed: [OR=3.6, 95%CI=1.4-9.0]) and dissatisfaction with employment status (OR=1.8, 95%CI=1.0-3.1) were predictive of LBP leading to consultation after adjusting for age and gender.</p> <p>Men: Occasional (RR=1.38, 95%CI=1.0-2.0) or often (RR=1.75, 95%CI=1.2-2.6) “do it yourself” activities (i.e., non-occupational physical activity), continued to be associated with LBP in the follow-up year after adjusting for age, psychological distress, and health.</p> <p>Women: fair health (RR=1.5, 95%CI=1.0-2.2; compared to excellent health) and regular sport (RR=1.34, 95%CI=1.1-1.7) continued to be associated with LBP in the follow-up year after adjusting for age, psychological distress and weight.</p> <p>Being female (OR=0.72, 95%CI=0.55-0.94), higher psychological distress at the age of 23 (OR=2.52, 95%CI=1.65-3.86), and early and continued</p>
Power et al. (2001)	Phase II	<ul style="list-style-type: none"> <li>• General population</li> <li>• 33 years old</li> <li>• pain free until the age of 32</li> <li>• N=5781</li> </ul>	<ul style="list-style-type: none"> <li>• gender</li> <li>• education</li> <li>• ergonomic factors</li> <li>• psychosocial work factors</li> </ul>	Incident LBP in the past 12 months (pain lasting more than one day)	

- psychological distress
- smoking
- social support
- children
- activity level
- social class at birth
- childhood psychological status
- somatization
- obesity
- Age
- Gender
- Marital status
- Contact with kids
- Availability of friends/neighbour
- Social contact
- Emotional support
- Instrumental support
- Psychological distress
- Smoking
- Physical activity
- Alcohol intake
- Self-rated health

smoking (OR=1.63, 95%CI=1.23-2.17) were predictive of LBP.

Muramatsu et al. (1997) Phase II

- Non-institutionalized Japanese adults
- 60 years old and older
- N=2200
- 1691 had no back pain at baseline

LBP onset

Age (being older; beta=0.03), emotional support (beta=0.10), psychological distress (beta=0.15), poor health (beta=0.09), light drinking (beta=0.37; compared to non drinking and moderate/heavy drinking), not having a friend/neighbour available (beta=-0.35), having little instrumental support (beta=-0.17) and comorbid medical conditions (beta=0.19) were predictive of LBP onset.

Mortimer et al. (2001)	Phase III Cohort	<ul style="list-style-type: none"> <li>• General population</li> <li>• 20-59 yrs old</li> <li>• no LBP in past 6 months</li> <li>• N=2401</li> </ul>	<ul style="list-style-type: none"> <li>• Comorbid illness</li> <li>• Functional limitations</li> <li>• Sports activities</li> <li>• BMI</li> <li>• Smoking</li> </ul>	LBP that leads to seeking care	<p>Men: Obesity increased the risk of LBP (RR=2.2, 95%CI=1.2-4.1).</p> <p>Women: 1-2 hours/week of high intensity sport activity increased the risk of LBP (RR=1.6, 1.1-2.4).</p>
Eriksen et al. (1999)	Phase III cohort	<ul style="list-style-type: none"> <li>• General population</li> <li>• 6 age cohorts between 20 and 72 years of age</li> <li>• Employed</li> <li>• no LBP in previous year</li> <li>• N=562</li> </ul>	<ul style="list-style-type: none"> <li>• Heavy physical work (lifting and standing)</li> <li>• Smoking (daily)</li> </ul>	LBP (pain in region below 12 <sup>th</sup> rib and above gluteal folds) in the past year and past week	<p>Smoking did not predict LBP 4 years later.</p> <p>Smoking status interacted with heavy physical work such that in those who smoked, engaging in heavy physical work increased the risk for LBP 4 years later (OR=5.53, 95%CI=1.93-15.84).</p> <p>In non-smokers, heavy physical work did not predict LBP.</p>

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Table 3.4 Summary of Accepted Articles Studying Prognostic Factors: Sample Characteristics, Factors Studied, Outcome & Results

Author	Study Design	Sample	Prognostic Factors Studied	Outcome	Results
Thomas et al. (1999)	Phase II	<ul style="list-style-type: none"> <li>General population</li> <li>18-75 years old</li> <li>registered with 2 general practices in the region</li> <li>free of LBP during the baseline period (1 month)</li> <li>Consulted due to LBP in 18 month period</li> <li>N=180</li> </ul>	<ul style="list-style-type: none"> <li>Demographics</li> <li>Lifestyle factors (physical activity, smoking)</li> <li>Self-rated health</li> <li>Psychological distress</li> <li>Current and past LBP</li> <li>Work status</li> <li>Social class</li> <li>Satisfaction with work status or current job</li> </ul>	Persistent disabling LBP (LBP disability at each follow-up; 1 week, 3 & 12 months)	Being a woman (OR=2.26, 95%CI=1.0-5.1), history of LBP (OR=2.76, 95%CI=0.8-9.9), dissatisfaction with employment situation (OR=2.61, 95%CI=1.2-5.8), widespread pain (OR=3.44, 95%CI=1.3-9.3), radiating leg pain (OR=1.89, 95%CI=0.8-4.4), and spinal restrictions (OR=3.08, 95%CI=1.3-7.3), were predictive of disabling LBP.
Macfarlane et al. (1999)	Phase II	<ul style="list-style-type: none"> <li>General population</li> <li>18-75 years old</li> <li>registered with 2 general practices in the region</li> <li>free of LBP during the baseline period (1 month)</li> <li>Consulted due to LBP in 18 month period</li> <li>N=180</li> </ul>	<ul style="list-style-type: none"> <li>Timing of symptom onset</li> <li>Pain in other areas of the body</li> <li>Pain severity</li> <li>Usual duration of pain episode</li> <li>LBP history</li> <li>General health</li> <li>BMI</li> <li>Physical activity</li> </ul>	Symptom status of LBP 1-2 weeks after consultation for LBP (recovered/ improved vs. same or worse)	Lower psychological distress (OR=8.8, 95%CI=1.8-43), sudden symptom onset (OR=4.2, 95%CI=1.1-16), no work-related pain (OR=7.8, 95%CI=1.7-36), and shorter symptom duration prior to consultation (2-3 weeks: OR=8.0, 95%CI=1.5-43; 0-1 weeks: OR=7.0, 95%CI=1.5-34) were predictive of early symptom improvement in men. None of the variables studied predicted

- Smoking
- Psychological distress
- Employment status
- Work satisfaction
- Perceived adequacy of income
- Social class
- Age
- Gender
- Marital status
- Contact with kids
- Availability of friends/neighbour
- Social contact
- Emotional support
- Instrumental support
- Psychological distress
- Smoking
- Physical activity
- Alcohol intake

early symptom improvement in women.

Muramatsu et al. (1997)

Phase II

- Non-institutionalized Japanese adults
- 60 years old and older
- N=2200
- 371 had back pain at baseline

LBP recovery (from back pain at baseline to no back pain at follow-up)

Higher levels of physical activity (beta=0.099), being younger (beta=0.161), having fewer comorbid conditions (beta=-0.113) and less emotional support (beta=-0.131) were associated with LBP recovery.

Power, Frank, Hertzman, Schierhout, and Li (2001) examined risk factors in individuals aged 32-33 years, after following them since birth. They studied individuals who were pain free throughout their life or who only developed pain in the past twelve months. Crude analyses found high level of exposure to ergonomic stress, high number of negative psychosocial work characteristics, job dissatisfaction and psychological distress at the age of twenty-three, early and continuous smoking, manual social class both currently and at birth, less than an "A level" education, moderate to low perceived life control, poorer emotional status during the ages seven to sixteen years, and high body mass index at the age of twenty-three to be associated with LBP incidence at 32-33 years of age. When all factors were entered into a full model, elevated risks of incident LBP remained for females (OR=0.72, 95%CI=0.55-0.94), those who reported higher levels of psychological distress at the age of twenty-three (OR=2.52, 95%CI=1.65-3.86), and early and continuous smoking reported between the ages of sixteen and thirty-three (OR=1.63, 95%CI=1.23-2.17).

One study (three articles) described risk factors for LBP in a sample of adults between the ages of 30 and 60 from Glostrup, Denmark. These Phase II studies examined the risk factors for first time LBP over a twelve-month period. They did not provide information about the strength of association between the identified risk factors and the onset of LBP. Indicators of first time experience of LBP in the follow-up year included pain in the top of the stomach (epigastric pain), number of hospitalizations, daily smoking, greater distance in kilometres from home to work in the employed, (Biering-Sørensen, Thomsen, and Hilden, 1989, Biering-Sørensen and Thomsen, 1986), shorter isometric endurance of back muscles (Biering-Sørensen et al., 1989), and greater number of operations (Biering-Sørensen and Thomsen, 1986). Biering-Sørensen (1984)

also described this cohort over twelve months. First time LBP in women was predicted by less mobile lumbar spines. In men, first time occurrence of LBP was predicted by more mobile lumbar spines and less isometric back muscle endurance. The authors also performed a discriminant analysis. For men, first time LBP was associated with age (direction not reported), higher levels of anterior spinal flexion and shorter isometric back muscle endurance. For women, first time LBP was associated with being younger, less maximal voluntary contraction, and longer endurance time.

Two Phase III studies examined risk factors for LBP in an adult population. Eriksen, Natvig, and Bruusgaard (1999) examined smoking and heavy physical work as risk factors for LBP in employed individuals between the ages of 20 and 72 who reported no LBP in the previous year. They found no association between smoking at baseline and LBP four years later. However, an association was found between having a job that included heavy lifting and much standing at baseline and onset of LBP four years later among smokers ( $OR=5.53$ ,  $95\%CI=1.93-15.84$ ), when adjusting for age, gender, civil status, emotional symptoms, physical exercise, having a job with monotonous movements, and having had musculoskeletal pain other than LBP in the previous year. This association was not found in non-smokers ( $OR=1.12$ ,  $95\%CI=0.48-2.59$ ). Having a job with heavy lifting and much standing ( $OR=2.30$ ,  $95\%CI=1.21-4.34$ ), exercising less than once a week ( $OR=1.55$ ,  $95\%CI=1.03-2.33$ ), having had musculoskeletal pain other than LBP during the previous year ( $OR=1.61$ ,  $95\%CI=1.03-2.52$ ) and the interaction between smoking and “heavy lifting and much standing on the job” ( $OR=4.04$ ,  $95\%CI=1.15-14.21$ ) predicted LBP four years later, after controlling for age, gender, marital status, emotional symptoms, and monotonous movements in the job. Thus, even when controlling for other factors, the interaction between smoking and type



of job remained, with “heavy lifting and much standing on the job” predicting the presence of LBP four years later only among smokers.

In the other phase III study, Mortimer et al. (2001) examined sports activities, body weight, and smoking as risk factors for new episodes of LBP resulting in care-seeking, after controlling for age, high physical work load, previous pain for longer than 3 months, and socio-economic status. Women who engaged in 1-2 hours/week of high intensity training irrespective of the amount of low intensity training were at higher risk for a new episode of LBP leading to seeking care (RR=1.6, 95%CI=1.1-2.4), when compared to those with no sport activity. Men who were obese were at higher risk for a new episode of LBP (RR=2.2, 95%CI=1.2-4.1), when compared to men who were of normal weight. Smoking was not an important risk factor.

Muramatsu, Liang, and Sugisawa (1997) examined the risk factors for LBP onset in non-institutionalized older adults in Japan (60 years and older). This Phase II study found age (being older; beta=0.03), higher levels of psychological distress (beta=0.15), poor health (beta=0.09), light drinking (beta=0.37; compared to non drinking and moderate/heavy drinking), greater levels of emotional support (beta=0.10), comorbidity (i.e., reporting more illnesses other than chronic low back pain; beta=0.19), not having a friend/neighbour available (beta=-0.35) and having little instrumental support (beta=-0.17) at baseline to be risk factors for reporting LBP onset three years later.

### 3.3.2.2 Lifetime Prevalence of LBP

Burton, Clarke, McClune, and Tillotson (1996) report a Phase I study in which 12-year-old children were followed yearly for five years. They found the lifetime prevalence and the annual incidence rates for low back pain to increase with age. They also found that the prevalence of low back pain was higher in boys (60%) than in girls

(40%), especially after the age of 15. In addition, participating in additional sports (outside of school sports) was associated with the lifetime prevalence of LBP (54% of boys in additional sports had LBP compared to 44% of boys who were engaged in school sports only). In boys alone, average sports exposure was a significant predictor of developing low back pain by the age of 15 (numbers not reported by the authors).

#### 3.3.2.3 LBP Recurrence

Two studies (nine articles) examined factors predictive of the recurrence of low back pain in adults from the general population. One article was a Phase I study. The remaining eight articles were Phase II studies. Biering-Sørensen (1983) described a Phase I study that examined prognostic factors for LBP in a sample of adults between the ages of 30 and 60 from Glostrup, Denmark. Older age in women, shorter length of time since the last low back pain episode and gradual onset of LBP was associated with recurrence of LBP at one-year follow-up. The authors did not provide information about the strength of the association between these factors and recurrence of LBP.

Three articles reported a study that examined the factors predictive of the recurrence of LBP over a twelve-month period in a sample of adults between the ages of 30 and 60 from Glostrup, Denmark. This study was Phase II in design. In men, recurrence of LBP was predicted by the course of LBP since onset (unchanged), more frequent LBP, sciatica (Biering-Sørensen et al., 1989), weaker trunk muscles, shorter time since the last LBP experience (Biering-Sørensen, 1984), pain or trouble in the lower limbs, headache at least a couple of times weekly (Biering-Sørensen and Thomsen, 1986) and living alone (Biering-Sørensen et al., 1989, Biering-Sørensen and Thomsen, 1986). In women, recurrence of LBP was predicted by having had a shorter time since the previous episode of LBP in relation to the day of examination (i.e., pain

on the day of the examination), waking at night due to LBP, the influence of standing on LBP (no influence), daily smoking (Biering-Sørensen et al., 1989), tighter hamstrings, weaker trunk muscles, larger fingertip to floor distance, shorter time since the last LBP experience, maximal voluntary contraction at forward flexion of the trunk (Biering-Sørensen, 1984), feelings of fatigue (Biering-Sørensen and Thomsen, 1986), and rumbling of the stomach (Biering-Sørensen and Thomsen, 1986, Biering-Sørensen et al., 1989). Again, the authors did not provide information about the strength of the association between the factors studied and recurrence of LBP.

Five articles reported results from a Phase II study that examined the factors predictive of LBP in adults living in South Manchester who were free of pain in the past month. Factors were studied in association with LBP that led to consultation over a 12-month period or that did not lead to consultation but was reported in a questionnaire twelve months later. Croft et al. (1996) found increased psychological distress at baseline to be predictive of LBP (leading to consultation [OR=1.78, 95%CI=1.08-2.96] or not leading to consultation [OR=1.65, 95%CI=1.22-2.21]), even after accounting for age, gender, car ownership, smoking and self-rated health. Previous LBP (for men [OR=4.48, 95%CI=3.3-7.1 for consulting LBP] and women [OR=2.9, 95%CI=1.7-5.1 for consulting LBP and OR=2.2, 95%CI=1.6-3.0 for non-consulting LBP]), current pain at other sites of the body (for men [OR=2.7, 95%CI=1.3-5.8 for consulting LBP] and women [OR=1.8, 95%CI=1.0-3.4 for consulting LBP and OR=1.9, 95%CI=1.3-2.7 for non-consulting LBP]) and current neck pain (Men: [OR=2.4, 95%CI=1.5-3.8 for non-consulting LBP]; Women: [OR=2.5, 95%CI=1.3-4.7 for consulting LBP and OR=1.9, 95%CI=1.3-2.7]) were associated with the recurrence of low back pain during the twelve-month period, after adjusting for psychological distress and pain variables

(Papageorgiou et al., 1996). Croft, Papageorgiou, Thomas, Macfarlane, and Silman (1999) examined the short-term risk of non-occupational physical stress for new episodes of LBP in the twelve-month follow-up period. In multivariate analyses, self-rated health was the strongest predictor of a new episode of LBP in men (RR=1.3, 95%CI=0.8-2.0) and woman (RR=1.5, 95%CI=1.0-2.2), after adjusting for age and psychological distress. In women, fair health (RR=1.5, 95%CI=1.0-2.2; compared to excellent health) and regular sport (RR=1.34, 95%CI=1.1-1.7; compared to not participating in sports on a regular basis) continued to be associated with LBP after adjusting for age, psychological distress and weight. In men, occasional (RR=1.38, 95%CI=1.0-2.0) or often (RR=1.75, 95%CI=1.2-2.6) “do it yourself” activities, continued to be associated with LBP after adjusting for age, psychological distress, and health.

When examining the risk factors for LBP that did not lead to consultation, age (compared to 18-29 year olds, 60-75 year old individuals had an OR of 0.69 [95%CI=0.49-0.96]), car ownership (i.e., not owning a car; OR=0.64, 95%CI=0.51-0.82) and fair (OR=1.59, 95%CI=1.09-2.33) or poor (OR=2.24, 95%CI=1.17-4.31) health rating were associated with LBP (Croft et al., 1996). LBP that did not lead to consultation was also predicted by dissatisfaction with work in the employed (slight dissatisfaction: OR=1.7, 95%CI=1.2-2.4; severe dissatisfaction: OR=2.0, 95%CI=1.2-3.3) after adjusting for age (Papageorgiou et al., 1997). Being slightly or severely dissatisfied with employment status was also associated with non-consulting LBP in both employed (slight dissatisfaction: OR=1.7, 95%CI=1.2, 2.4; severe dissatisfaction: OR=2.0, 95%CI=1.2-3.3) and non-employed (slight dissatisfaction: OR=1.6, 95%CI=1.1-2.4; severe dissatisfaction: OR=2.0, 95%CI=1.2-3.1) individuals after

adjusting for age and gender (Papageorgiou, Croft, Thomas, Silman, and Macfarlane, 1998).

LBP that did lead to consultation with a physician was predicted by having a perceived inadequacy of income (OR=3.6, 95%CI=1.8-7.2) and dissatisfaction with employment status (OR=1.8, 95%CI=1.0-3.1), after adjusting for age (Papageorgiou et al., 1997). Lower social class in women (OR=7.7, 95%CI=2.1-27.8) was also predictive of LBP leading to consultation (Papageorgiou et al., 1997). Papageorgiou et al. (1998) also examined factors predictive of consulting LBP and found being slightly dissatisfied with employment status (as opposed to being satisfied; OR=1.8, 95%CI=1.0-3.1) to be an important factor in employed individuals after adjusting for age and gender. Perceiving ones income as severely inadequate was also associated with consulting LBP in employed (OR=3.6, 95%CI=1.8-7.2) and non-employed (OR=3.6, 95%CI=1.4-9.0) individuals after adjusting for age and gender. These relationships remained the same after also adjusting for history of back pain, psychological distress or social class (Papageorgiou et al., 1998).

#### 3.3.2.4 Disabling LBP

A Phase II study examined the risk factors for being sick-listed because of LBP during the previous seven years and during the previous twelve-months (Müller et al., 1999). In their final models, these authors found previous sciatic pain (OR=3.78, 95%CI=1.77-8.06), sick-listing in general (i.e., due to illness other than LBP; compared to those with no weeks of sick-listing, those who were sick listed for 1-2 weeks had an OR=2.24 [95%CI=1.09-4.58] and those who were sick-listed for 5 weeks or more had an OR=4.93 [95%CI=1.85-13.14]), use of analgesics (OR=2.57, 95%CI=1.24-5.36), age (compared to 50 year olds, those who were 30 had an OR=2.67 [95%CI=1.6-6.15] and

those who were 40 had an OR=2.80 [95%CI=1.16-6.76]), occupation (compared to white-collar workers, self-employed individuals had an OR=3.11 [1.00-9.64] and unskilled workers had an OR=3.50 [1.63-7.54] and test results on the trunk-raising test (compared to those with 100%, those with 60-80% had an OR=0.41 [0.17-1.00] and those with 50% had an OR=2.40 [0.74-7.77]) to be associated with being sick-listed in the previous twelve-months. Previous sick listing due to LBP (OR=3.25, 95%CI=1.92-5.48), sick-listing in general (OR=1.86, 95%CI=1.15-3.01 for 1-2 weeks and OR=2.59, 95%CI=1.16-5.74 for 5 weeks or more), use of analgesics (OR=2.45, 95%CI=1.46-4.10), and age (OR=2.05, 95%CI=1.22-3.43 for 30 year olds, and OR=2.09, 95%CI=1.21-3.60 for 40 year olds) were also associated with being sick-listed due to LBP in the previous seven years.

### 3.3.3 Prognostic Factors

In samples of individuals who were suffering from low back pain, only three studies examined prognostic factors. One study examined the factors predictive of persistent disabling pain. Two other studies looked at prognostic factors of recovery from low back pain.

#### 3.3.3.1 Disabling LBP

One Phase II study examined the prognostic factors for persistent disabling LBP over a twelve-month period in adults living in South Manchester (Thomas et al., 1999). Being a woman (OR=2.26, 95%CI=1.0-5.1), having a history of LBP (OR=2.76, 95%CI=0.8-9.9), dissatisfaction with current employment or work status (OR=2.61, 95%CI=1.2-5.8), widespread pain (OR=3.44, 95%CI=1.3-9.3), radiating leg pain (OR=1.89, 95%CI=0.8-4.4), and restriction in two or more spinal movements (OR=3.08, 95%CI=1.3-7.3) were predictive of persistent disabling LBP.

### 3.3.3.2 Recovery from LBP

Two studies examined recovery from LBP. One Phase II study examined predictors of early improvement in low back pain among people who had consulted a general practice (Macfarlane et al., 1999). This sample was the one previously described from South Manchester. They found lower psychological distress ( $OR=8.8$ ,  $95\%CI=1.8-43$ ), sudden symptom onset ( $OR=4.2$ ,  $95\%CI=1.1-16$ ), no work-related pain ( $OR=7.8$ ,  $95\%CI=1.7-36$ ), and shorter symptom duration prior to consultation (2-3 weeks:  $OR=8.0$ ,  $95\%CI=1.5-43$ ; 0-1 weeks:  $OR=7.0$ ,  $95\%CI=1.5-34$ ) to be predictive of early symptom improvement in men. None of the variables studied predicted early symptom improvement in women.

The other Phase II study described factors associated with recovery from LBP in non-institutionalized older adults (60 years old and over) in Japan (Muramatsu et al., 1997). Higher levels of physical activity ( $\beta=0.099$ ), being younger ( $\beta=0.161$ ), having fewer comorbid conditions ( $\beta=-0.113$ ) and less emotional support ( $\beta=-0.131$ ) at baseline were all associated with recovery from LBP.

## 3.4 Discussion

The literature on the risk/prognostic factors for low back pain is vast and continues to grow. As of the end of 2001, 439 abstracts were identified as relevant to the study of this area. However, only fifty articles actually studied risk/prognostic factors using a longitudinal design. Of those fifty articles, twenty articles, representing only nine distinct study samples, were judged to be of sound methodological quality using the criteria described. The small number of acceptable studies points to the need for more well designed cohort studies. However, the present studies do provide some

important information regarding the valid risk/prognostic factors for LBP in the general population.

#### 3.4.1 Children and Adolescents

The acceptable literature on LBP in children and adolescents was sparse. Two studies examined risk factors for LBP onset and one study examined risk factors for the lifetime prevalence of LBP. One article described a Phase III confirmatory study that identified smoking as a risk factor, after controlling for confounding. The other exploratory analyses (Phase II studies) provided evidence to suggest that being taller, having a larger hump size, a higher growth spurt, and decreased flexibility in the quadriceps and hamstrings are also risk factors for LBP onset. Exploratory evidence also suggested that being male and participating in sports activity that is in addition to regular school sports activities were predictive of LBP lifetime prevalence. Further study of these potential risk factors for LBP in childhood and adolescence is needed.

#### 3.4.2 Adults

##### 3.4.2.1 Risk Factors

Risk factors for the development of LBP were studied in only four distinct samples of adults in the general population and one sample of adults over the age of sixty. Two confirmatory studies examining risk factors for LBP studied the predictive ability of smoking. Both studies concluded that smoking was not a significant risk factor. However, smoking was found to interact with heavy physical labour, such that this type of labour increased the risk of LBP in smokers but not in non-smokers. Therefore, unlike in childhood and adolescence, in adulthood smoking did not increase the risk of LBP in and of itself. These confirmatory studies also found high intensity training/physical activity in women and obesity in men to increase the risk of LBP onset.



The remaining factors that were identified as potential risk factors for adults in the general population through exploratory studies were gender (female), age (older), increased psychological distress, epigastric pain, previous hospitalizations and operations, greater distance between work and home, less back muscle endurance, and less lumbar spine mobility. Exploratory evidence with an older adult sample also identified older age and greater psychological distress as risk factors, along with poor health, comorbid conditions, light drinking (compared with no or heavy drinking), emotional support, not having a friend/neighbour available and little instrumental support. Further examination of these risk factors identified through exploratory analysis is required, as is replication of the confirmatory studies regarding the predictive value of smoking, obesity, and physical activity.

Risk factors for the recurrence of low back pain were examined in two distinct adult samples. Both studies examined the relationship between the risk for LBP separately in men and women. Recurrence of LBP was predicted by sociodemographic factors (age [older], lower socioeconomic status, and living alone), work-related factors (work-dissatisfaction, dissatisfaction with employment status, perceived inadequacy of income), LBP-related factors (gradual onset of LBP, unchanged course of LBP since onset, greater frequency of LBP, shorter time since last LBP episode, no influence of standing on the low back pain, history of LBP), pain-related factors (sciatica, pain/trouble in lower limbs, headache, pain in other body sites), health-related factors (poor self-rated health, greater psychological distress, fatigue, rumbling of stomach, waking at night, smoking), physical factors (weaker trunk muscles, less hamstring flexibility, less back flexibility), and activity levels (sport activity in women, “do-it-

yourself' leisure activities in men). Further examination of these factors that were found through exploratory studies is required.

Risk factors identified for being "sick-listed" due to LBP included sociodemographic factors (older age, occupation), previous sciatic pain, use of analgesics, sick-listing in general (i.e., due to illness other than LBP), and previous sick-listing due to LBP.

#### 3.4.2.2 Prognostic Factors

An exploratory study (phase II) examined the prognostic factors for disability in LBP sufferers. Disabling LBP (leading to activity restriction) was predicted by gender [female], pain-related factors (having a history of LBP, widespread pain, radiating leg pain, and restriction in two or more spinal movements), and dissatisfaction with current employment or work status. Some of the variables found to be predictive of LBP disability were similar to the prognostic factors for LBP recurrence. Further study of these variables in different samples and through confirmatory designs are needed to validate these prognostic factors.

Prognostic factors for recovery from LBP were examined in only two distinct samples. Again, only exploratory studies were conducted. In adults, recovery from LBP was predicted by decreased psychological distress, sudden symptom onset, the absence of work-related pain, and shorter symptom duration prior to consultation. In a sample of older adults (60 years of age and older), recovery from low back pain was predicted by age (younger), higher levels of physical activity, fewer comorbid conditions and less emotional support. Some of these variables were similar to the variables predictive of recurrence or disability, only in the opposite direction (e.g., psychological distress, onset

of LBP symptoms). Again, clarification of these prognostic factors in confirmatory studies with other samples is required.

### 3.4.3 Conclusions

The limited number of studies still provides some important evidence regarding the risk/prognostic factors for LBP in the general population. Smoking was found to be predictive of LBP onset in children/adolescents but not in adults. The reasons for this disparity are unclear but are in need of further study. Numerous other factors were found to be predictive of LBP onset, recurrence, disability, and recovery in exploratory studies. Further study is required to confirm or refute the predictive role of these variables.

It is important to note that this review does have several limitations. First, only published studies were considered for review. Second, only one database (Medline) was searched for abstracts. There may be unpublished or nonindexed studies that would add important information to the literature. The presence of only one reviewer may have also caused some bias in the selection and ratings of studies. However, all attempts were made to follow guidelines stringently in order to minimize bias.

Despite these limitations, the present review provides information regarding the current state of evidence regarding the risk/prognostic factors for LBP in the general population. It suggests that smoking, which has been long thought to be a salient risk factor, does not hold up as a valid risk factor for LBP onset when other important factors are controlled for. The results also identify several risk factors with some evidence of being able to predict LBP onset, recurrence, or sick-listing and several prognostic factors with evidence of being able to predict disability or recovery. Future research should seek to further study these factors.

#### **4. STUDY 3: Passive Coping as a Risk Factor for Disabling Pain**

#### 4.1 Introduction

Coping has been found to be an important factor in the area of stress and adjustment. However, there has been limited examination of the relationship between coping behaviour and measures of outcome or adjustment in pain sufferers in the general population. The majority of the studies that have examined this relationship have looked at pain clinic patients, who may differ from those experiencing neck or back pain in the general population (Turk & Rudy, 1990). As a result, it is important to examine the relationship in this population. In addition, the majority of the previous studies have been cross-sectional in design. The purpose of the present study was to conduct a longitudinal study that assessed the relationship between coping and outcome in neck and low back pain sufferers in the general population. These pain sufferers in the general population are experiencing pain of varying intensity. However, the large majority of them are continuing with their daily activities with minimal interference from their pain. One can question what factors cause some of these pain sufferers to continue on with their lives despite their pain while others go on to become severely disabled by the pain. Pain sufferers use a variety of coping strategies on a daily basis to deal with their pain. The present study examined the role of coping behaviour in predicting the development of disability in pain sufferers over a twelve month period. The study examined this relationship when other potentially confounding factors were taken into consideration, that is, it is a Phase III prognostic study (Altman and Lyman, 1998; Côté et al., 2001).

## 4.2 Methodology

### 4.2.1 Participants

The participants for the present study consisted of a random sample of the Saskatchewan adult population. The Saskatchewan Health and Back Pain Survey (SHBP; Appendix D) was a 12-month follow-up survey primarily designed to assess the prevalence and incidence of neck and back pain in the general Saskatchewan adult population (Cassidy et al., 1998). This survey was carried out in Saskatchewan in 1995/1996. All noninstitutionalized Saskatchewan residents between the ages of 20 and 69 who held a valid Saskatchewan Health Services card on August 31, 1995 (N=601,455) were included in the target population. Inmates of provincial correction facilities, residents under the Office of the Public Trustee, foreign students and workers holding employment or immigration visas, and residents of special care homes were excluded.

The actual population to which the survey was sent was an age-stratified random sample of individuals meeting the inclusion criteria. These individuals were sent the baseline questionnaire in September 1995. The sampling frame used was the Saskatchewan Health Insurance Registration File (HIRF). The HIRF provided a representative, complete, and current list of all Saskatchewan adults and it represented the best sampling frame to obtain a probability sample of the Saskatchewan adult population. The target population was stratified in five age groups of ten-year intervals. The randomization was conducted by the Health Insurance Registration branch of Saskatchewan Health to preserve the confidentiality of HIRF.

The target population consisted of 601,455 individuals between the ages of twenty and sixty-nine. Saskatchewan Health randomly selected a sample of 2,184

inhabitants. One hundred and twenty-nine questionnaires (5.9%) were returned to Saskatchewan Health in Regina because of mailing errors, death, the person leaving the province, and health reasons. These people were considered ineligible for the study. Thus, the actual population sample eligible to be included in the study consisted of 2055 individuals. The response rate obtained from the first stage of the survey was 55.1% (1,131 participants).

Six months following the index stage, follow-up questionnaires were sent out to individuals who responded to the index questionnaire. The response rate for the six month follow-up questionnaire was 74.8% (846 participants). Twelve months after the index stage, follow-up questionnaires were mailed to those who responded to the six-month questionnaire. The response rate for the 12-month follow-up questionnaire was 62.9% (711 participants).

The population at risk in the present study were those individuals who were experiencing neck or low back pain but were not disabled by their pain. Respondents to the Saskatchewan Health and Back Pain survey were included in the study sample if they reported the presence, in the past six months, of non-disabling neck and/or low back pain (i.e., Grade I or II spinal pain according to the Chronic Pain Questionnaire; Von Korff, Ormel, Keefe, & Dworkin, 1992) on the index questionnaire or the six-month follow-up questionnaire. This questionnaire is described later in this document. Respondents were excluded if they did not complete the Passive scale of the Vanderbilt Pain Management Inventory (PMI; Brown & Nicassio, 1987). In accordance with the administration instructions published with this questionnaire, only those individuals reporting neck or back pain in the past six months completed the Pain Management Inventory. The individuals included in the study formed a dynamic cohort. A dynamic

cohort is such that individuals can enter the cohort if they meet the inclusion criteria at any observation point throughout the observation period (Rothman, 1986). Thus, individuals who did not meet the inclusion criteria at baseline could enter the cohort if they reported non-disabling neck and/or low back pain on the six-month follow-up questionnaire. This yielded a study sample of 571.

Of these 571 respondents, 521 individuals suffered from non-disabling neck or low back pain at baseline. Two hundred and ninety individuals remained at risk at six-month follow-up (i.e., they continued to experience pain but this pain was not disabling), while 200 individuals were censored due to attrition or the report of no longer experiencing pain. Thirty-one individuals developed disabling neck or low back pain at six-month follow-up and 14 more individuals developed disabling pain at 12-month follow-up, yielding a total of 45 cases. At six-months, an additional 50 individuals entered the population at risk by reporting non-disabling neck or low back pain. Ten of these individuals developed disabling spinal pain at 12-month follow-up. Eighty-seven individuals were censored due to attrition or the report of no more pain at this follow-up period. Additionally, 229 individuals had stable, non-disabling pain levels throughout the one-year follow-up. Thus, of the 571 respondents included in the study sample, 55 individuals developed disabling neck or low back pain (Figure 4.1).

#### 4.2.2 Procedure

The initial stage of the survey was conducted in September 1995. This stage of the survey consisted of three waves of mailing: the original questionnaire on September 21, 1995, a reminder card sent a week following the initial mailing, and a second questionnaire to nonrespondents three and a half weeks after the initial questionnaire. Respondents to this survey received follow-up questionnaires six and twelve months



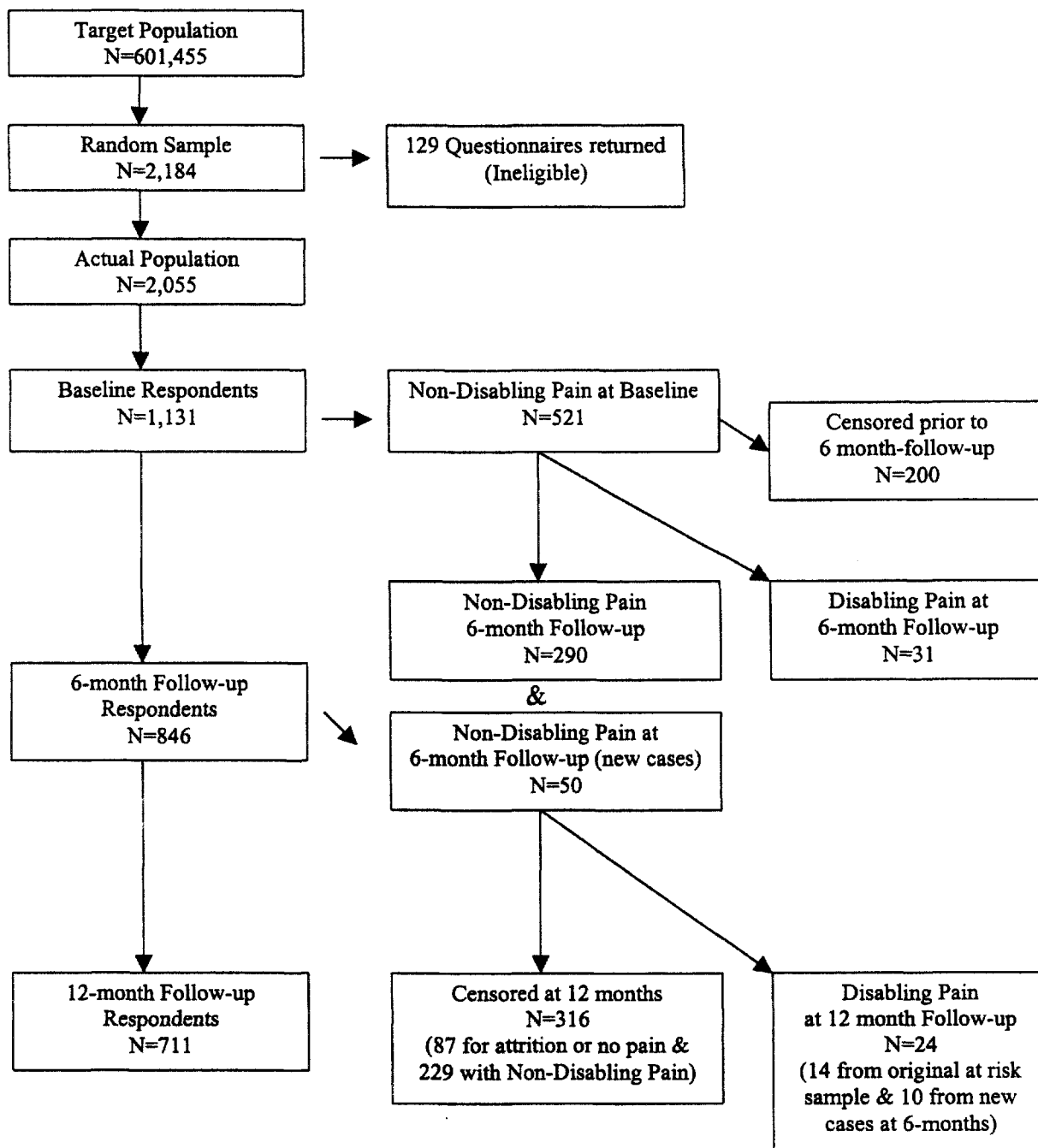


Figure 4.1 Summary of Study 3 Participants

later. The survey consisted of a variety of published questionnaires and questions about demographic and socio-economic characteristics, and is described below.

#### 4.2.3 Outcome Variable: Development of Disabling Pain, as assessed by the Chronic Pain Grade (von Korff et al., 1992)

The purpose of the present study was to examine the relationship between the coping behaviour used by an individual to deal with pain and subsequent outcome. In a general population of pain sufferers there are a variety of variables that can be used to assess outcome. It could be of interest to note how one's coping behaviour affects the intensity of one's pain, the psychological distress one experiences, or the amount of interference the pain has on one's daily activities. Each of these factors contributes to the overall severity of the pain experience. In the present study, the focus was on the role of coping behaviour on the development of pain-related disability. Individuals who are suffering from pain experience varying levels of disability due to their pain. It is important to examine the potential role that coping behaviour plays in the development of disabling pain. Thus, the outcome variable in the present study was disability due to pain. Disability refers here to interference with usual activities, rather than complete inability to work, as it is sometimes used.

The Chronic Pain Grade (von Korff et al., 1992; Appendix D, pp. 253-256) is a graded classification of pain. It is a 7-item measure that assesses the severity of the pain according to its intensity and debilitating effects. Von Korff (1992) argues that pain measures that reflect only pain intensity may not adequately discriminate within the higher levels of pain severity. He argues that pain-related disability is at least as important as pain intensity in discriminating among the highest levels of pain severity.

Thus, this scale includes both intensity and disability in measuring the severity of pain, resulting in an ordinal scale that classifies pain that is high in intensity and debilitating effects as most severe. The first three items measure the intensity of: 1) pain in the present, 2) worst pain in the past six months, and 3) average pain in the past six months. The remaining four items measure disability. The first question asks for a report on the number of days the person was away from her/his usual activities in the last six months. The remaining three items question the amount of interference the pain has caused on the ability to carry on any activities, take part in recreational or family activities, and work in the past six months. The disability days item asks respondents to choose from 0-6, 7-14, 15-30, or 31 or more days. All other items require the respondent to make a rating on a scale from 0 to 10.

Using these questions, pain severity is graded into five hierarchical categories: Grade 0 - No Pain in the past six months; Grade I - Low disability-low intensity pain; Grade II - Low disability-high intensity pain; Grade III - High disability-moderately limiting pain; and Grade IV - High disability-severely limiting pain. Pain that is disabling is considered more severe than pain that is intense but does not lead to interference in activities. Grades III and IV pain severity levels are scored independently of pain intensity because pain intensity has not been found to add any important information for these pain grades (Von Korff, 1992). Average pain intensity levels tended to be higher for these two grades relative to grade II pain. However, it was the information regarding disability that clearly differentiates these grades from the others and provides important information regarding the pain experience. Those individuals who are experiencing some form of pain can either be low (Grade I and Grade II) or high (Grade III and Grade IV) in disability. This classification into non-

disabling vs. disabling pain was used in the present study. This is useful in classifying disability because it provides information on the debilitating effects of pain in a variety of areas of living (i.e., daily activities, recreation, and work).

The use of this measure of pain severity allowed for the description of people's pain experiences based on their level of intensity and disability. This scale is, thus, able to provide a richer description of the pain experience by identifying those individuals who are suffering from pain of varying intensity and varying disability. This questionnaire is a valid, reliable instrument that has been well studied. Psychological impairment, illness behaviour, functional disability, and other indicators of pain dysfunction have been found to increase as would be expected as pain grade increases (Von Korff et al., 1992).

Although this scale has not been validated with neck pain, it has shown adequate reliability for the assessment of back pain (Cronbach's  $\alpha=0.74$ ; Von Korff et al., 1992). In addition, it has shown adequate reliability for headache and temporomandibular pain disorder with alpha coefficients of 0.67 and 0.71, respectively (Von Korff et al. 1992). More importantly, pain grade has also demonstrated predictive validity, which is arguably the most important type of validity. Baseline pain grade predicted future pain severity, elevated depression, self-rated health, frequent opioid use, frequent pain visits to the doctor, high pain impact and unemployment at one year follow-up (Von Korff et al., 1992).

This scale has also shown good reliability and validity in a general population of pain sufferers. In a sample of pain sufferers from the general population, Smith et al., (1997) found the Chronic Pain Grade to have good internal consistency (Cronbach's  $\alpha=0.91$ ) and factorial validity. It also correlated well and in the appropriate direction

with measures of general health and well-being (i.e., the scales of the SF-36;  $r=-0.38$  with mental health to  $r=-0.84$  with pain). In a similar sample, Penny et al. (1999) found it to demonstrate good validity. More severe pain grades were associated with lower scores on health dimensions of the SF-36. Also, higher pain severity tended to correspond with higher scores on a measure of pain dimensions (Penny et al., 1999). Therefore, the Chronic Pain Grade was used in this study because it has been carefully and well studied, has excellent validity and incorporates two major components of pain severity (i.e., pain intensity and disability or interference related to this pain).

To score the Chronic Pain Grade, the first step is to compute the characteristic pain intensity and the disability score. The characteristic pain intensity is scored by taking the average of items 1 to 3 and multiplying it by 100. The disability score is computed by taking the mean of items 5 to 7 and multiplying that by 100. The disability score is then categorized from 0 to 3. A disability score ranging from 0% to 29% is given a disability score of 0. Scores ranging from 30 to 49% receives a 1, scores ranging from 50 to 69% receive a 2 and scores of 70% and above receive a 3. The item that looks at disability days is also categorized from 0 to 3. In a similar fashion, 0 to 6 days receives a score of 0, 7 to 14 days receives a score of 1, 15 to 30 days receives a score of 2, and 31 or more days receives a score of 3. The disability days and disability score are then summed to arrive at the total disability points, which range from 0 to 6. Disability points and the pain intensity score are used to arrive at the final chronic pain grade.

Grade 0 is equivalent to no pain. Someone who has a characteristic pain intensity that is less than 50 and disability points less than 3 receives a Grade I, or low intensity, low disability. A respondent with a characteristic pain intensity greater than 50 and disability points less than 3 receives a Grade II, or high intensity pain which is

not disabling. Someone with disability points of 3 or 4, regardless of characteristic pain intensity, receives Grade III and disability points of 5-6, regardless of pain intensity, receives Grade IV. Both Grades III and IV are considered high levels of disability.

#### 4.2.4 Exposure Variable: Passive Coping, as measured by the Pain Management Inventory (Brown & Nicassio, 1987)

In epidemiological literature, an exposure variable is the factor of interest that is associated with the disease or outcome (Fletcher, Fletcher, and Wagner, 1988). The person has a measurable manifestation of the factor in question prior to the outcome under study. The exposure variable in the present study was coping behaviour. It was the relationship between this variable and the outcome variable, when other factors are controlled, that was of most interest. The measure used to assess coping behaviour in the present study provided information regarding both active and passive coping. Active coping is defined as coping strategies that require the patient to take responsibility for pain management and involve attempts to control the pain or to function in spite of it. Passive coping behaviour consists of coping strategies that involve giving responsibility for pain management to an outside source or allowing other areas of life to be adversely affected by pain (Brown & Nicassio, 1987). Previous research has shown passive coping to be more highly related to pain severity, which is the outcome variable in the present study (Mercado, Carroll, Cassidy, and Côté, 2000; Carroll, Mercado, Cassidy, and Côté, 2002). Passive coping has also been shown to be more reliably associated with outcome (e.g., Brown & Nicassio, 1987, Brown, Nicassio, & Wallston, 1989, Smith & Wallston, 1992, Snow-Turek, Norris, & Dwyer, 1996). Therefore, the passive coping scale was used as the exposure variable in the present study. Active coping was considered as a potential confounder.

The Vanderbilt Pain Management Inventory (Appendix D, p. 259) was used to assess coping behaviour because it is a brief measure of active and passive coping that has demonstrated adequate reliability. The 11-item PMI was used in the SHBP survey. The original, 18-item PMI has primarily been used and validated with a rheumatoid arthritis population (Brown & Nicassio, 1987, Smith, Wallston, & Dwyer, 1995). With that population, the Active Coping scale has demonstrated an adequate internal consistency, with a Cronbach's alpha of 0.71. The Passive Coping scale has also demonstrated an adequate internal consistency with a Cronbach's alpha of 0.82. The two scales were slightly negatively correlated ( $r=-0.29$ ) and they were adequately stable over a six month period (Active coping,  $r=0.65$ ; Passive coping,  $r=0.69$ ; Brown & Nicassio, 1987).

Snow-Turek et al. (1996) also examined the psychometric properties of the 18-item PMI with their pain clinic population. They found the PMI Active Coping scale and the Passive Coping scale to have adequate internal consistency, with alphas of 0.65 and 0.73, respectively. In terms of convergent validity, the Coping Strategies Questionnaire (Rosenstiel & Keefe, 1983) and PMI active scales were found to be significantly correlated. In addition, their passive scales were also significantly correlated.

The abbreviated 11-item version of the PMI has also been used with a rheumatoid arthritis population. The abbreviated Active Coping and Passive Coping scales also demonstrated adequate internal consistency, with alphas of 0.64 and 0.69 (Smith et al., 1995). The abbreviated PMI has also demonstrated adequate internal consistency and factorial validity in a general population of neck and/or back pain sufferers. The active coping scale demonstrated had an alpha of 0.69 and the passive

coping scale had an alpha of 0.75 (Mercado et al., 2000). A factor analysis of the PMI with this population yielded the two factors found by the original authors, providing support for its validity (Mercado et al., 2000). Thus, the PMI active and passive coping scales have demonstrated adequate reliability and validity with the rheumatoid arthritis population and a general population of neck and/or back pain sufferers.

As described previously, the PMI is made up of two coping scales. Each scale is composed of items that require the respondent to rate their use of a particular coping strategy on a five point Likert scale. The Active Coping Scale and the Passive Coping Scale are scored separately and are orthogonal. The responses for each item in the subscale are added to yield a score for that subscale. The Active Coping Scale consists of items 1, 3, 4, 8, and 10 and the Passive Coping Scale consists of items 2, 5, 6, 7, 9, and 11. A high score on either scale suggests a high use of that coping style.

#### 4.2.5 Potential Confounders

In addition to the measure of pain severity and coping style, the survey instrument contained a number of other measures, which were assessed as potential confounders. Whether each measure was used depended on (a) theoretical plausibility, (b) empirical evidence (i.e., factors identified as important in the systematic review or crude analyses from the current study), and (c) other statistical considerations, such as collinearity of factors and model stability or “fit”.

##### 4.2.5.1 Pain-related Factors

Several pain-related factors were included in the present study. History of injury to the neck and/or back and pain persistence were assessed.

History of Injury. In addition to pain severity, history of injury to the neck and/or back was assessed. History of injury was assessed using two questions. The first



question asked whether the respondent had ever injured their neck or back in a motor vehicle accident. The second question asked if they had ever injured their neck or back at work.

Pain Persistence. Pain persistence was assessed with a question that asked how many days in the past six months that the respondent has had neck and/or back pain. The respondent had to choose between 0 days, 1-30 days, 31-89 days, or 90-180 days. This measure was included because it has been found that pain persistence may provide additional information in the prediction of pain dysfunction (Von Korff et al., 1992).

#### 4.2.5.2 Sociodemographic Factors

The sociodemographic variables that were examined included age, gender, marital status, employment status, main work activity, highest education level, and family income. In order to avoid small cell sizes, which would produce an unstable multivariate model, some categories within these variables were combined. Marital status was coded as married/common-law, no longer married (including separated or divorced and widowed), or never married. Employment status was assessed on the questionnaire by asking individuals to indicate if they were working full-time, working part-time, a homemaker, a student, unemployed, on maternity leave, on compensation, retired, or on disability leave. However, for the present analyses, employment status was dichotomized. The category of not employed was composed of individuals who were unemployed, on compensation, retired, or on disability leave. Individuals were coded as other employment status if they indicated full-time work, part-time work, homemaker status, on maternity leave, or student status. An assessment of main work activity was made using a single question that asked individuals to choose between six

descriptions of their job (heavy labour, light labour, mostly sitting at a desk, driving or operating a vehicle, mostly standing, or mostly walking or moving about).

Education level was separated into five categories: university graduate, post-secondary education, high school graduate, higher than grade 8 and less than grade 8. Family income was assessed as under \$20,000, \$20,000-\$40,000, \$40,000-\$60,000 or above \$60,000.

#### 4.2.5.3 Health-Related Factors

The health related variables that were included in the study were body mass index, exercise frequency, smoking status, subjective health status, depressive symptoms, and comorbid illness. Body mass index was a continuous variable that was calculated using the participant's height and weight. Exercise frequency was assessed by asking individuals to indicate number of days that they engaged in exercise per week. Smoking was a categorical variable. Respondents were categorized as non-smoker, ex-smoker, or current smoker.

Subjective Health Status. Subjective health status was assessed using the General Health subscale of the SF-36 (Appendix D, pp.247-251). The SF-36 is a 36 item questionnaire that measures each of eight health concepts: 1) physical functioning; 2) role limitations because of physical health problems; 3) bodily pain; 4) social functioning; 5) general mental health (psychological distress and psychological well-being); 6) role limitations because of emotional problems; 7) vitality (energy/fatigue); and 8) general health perceptions (Ware & Sherbourne, 1992).

The General Health scale is made up of five items that assess personal health. The first item asked the respondent to rate their general health on a five-point scale ranging from poor to excellent. The other items required the respondent to rate how true

four statements are for them (I seem to get sick a little easier than other people. I am as healthy as anybody I know. I expect my health to get worse. My health is excellent.) on a 5 point scale. It provides a direct measure of the respondent's personal evaluation of his/her health with higher scores indicating the perception of better personal health (Ware, Snow, Kosinski, & Gandek, 1993). The SF-36 General Health scale has demonstrated good internal consistency reliability in general and medical population samples (Ware et al., 1993). These reliability estimates range from 0.78 in a medical population sample with one or more chronic conditions to 0.90 in a sample of general practice patients. Test-retest reliability has also been established for a six month interval with diabetic patients ( $r=0.83$ ) and a two week interval with general practice patients ( $r=0.80$ ).

The General Health scale correlates well with all other SF-36 scales. It is most highly correlated with the Physical Functioning and Role Functioning scales ( $r=0.69$ ) and least correlated with the Role Emotional scale ( $r=0.43$ ; Ware et al., 1993).

Depressive Symptoms. The presence of depressive symptoms was assessed using the Centre for Epidemiological Studies Depression Scale (CES-D; Radloff, 1977; Appendix D, p. 260). The CES-D was developed specifically for studies that assess the epidemiology of depressive symptomatology in the general population (Radloff, 1977). It is a 20-item self-report measure that requires respondents to rate how frequently they experienced each symptom in the past week. The ratings are made on a four point scale from 0 = rarely or none of the time (less than 1 day) to 3 = most or all of the time (5-7 days).

The CES-D has been used with general populations, medically ill patient populations, and psychiatric populations (Radloff, 1977; Weissman, Sholomskas,

Pottenger, Prusoff, and Locke, 1977; Devins et al., 1988). Internal consistency reliability estimates have been found to range between 0.85 to 0.90 in all of these populations (Radloff, 1977; Weissman et al., 1977; Orme, Reis, and Herz, 1986; Devins et al., 1988). Test-retest reliability has been found to be between 0.45 to 0.70, with larger reliability estimates for shorter time intervals (Radloff, 1977; Devins et al., 1988).

The validity of the CES-D has been assessed with general populations, medically ill patients, chronic pain patients, and psychiatric populations (Radloff, 1977; Weissman et al., 1977; Boyd, Weissman, Thompson, and Myers, 1982; Devins et al., 1988). Its concurrent validity has been demonstrated as it has been shown to correlate well with other scales measuring depression and with interviewer and clinician ratings of depression (Radloff, 1977; Weissman et al., 1977; Boyd et al., 1982). The CES-D has also demonstrated discriminant validity. It has been found to discriminate between psychiatric and community samples (Weissman et al., 1977). It can also discriminate between different levels of depression within a psychiatric population (Weissman et al., 1977).

The CES-D has also demonstrated adequate factorial validity. It has been found to have a four-factor structure with a general population (Radloff, 1977). This factor structure has also been found with medically ill patients (Devins et al., 1988).

With pain patients, Blalock, DeVellis, Brown and Wallston (1989) found the CES-D to overestimate the prevalence or severity of depression. They suggest the removal of the somatic items when dealing with pain populations. However, Turk and Okifuji (1994) did not find the removal of these items to improve the effectiveness of the test. Also, other researchers have found the CES-D to be a useful tool for measuring

depression in chronic pain populations with the CES-D scores capable of predicting the development of chronic pain (Magni, Moreschi, Rigatti-Luchini and Merskey, 1994).

Radloff (1977) used a cutoff score of 16 for general populations and psychiatric populations. That cutoff score has also been used with community samples (Boyd et al., 1982; Myers & Weissman, 1980). However, Turk and Okifuji (1994) advocate the use of 19 as the cutoff score with a chronic pain population. They found this cutoff score to yield a sensitivity of 0.82 and a specificity of 0.62. Using a cutoff score of 16 with that population, the CES-D demonstrated a sensitivity of 0.86 and a specificity of 0.50 (Turk and Okifuji, 1994). Thus, increasing the cutoff score to 19 with this population lowers the sensitivity while slightly increasing the specificity.

To score the CES-D, four items must be reversed (items 4, 8, 12, and 16). A total score is then obtained by summing across all items. Radloff (1977) has recommended that the scale should not be scored if more than four items are not completed. Higher scores mean higher levels of depressive symptoms. In any data analyses that required this variable to be dichotomized, a cutoff score of 16 was used because it has shown adequate sensitivity and specificity with community samples and a pain population.

The CES-D was used to assess depressive symptomatology in the present study because it is a brief measure that has been found to have adequate reliability and validity. It has demonstrated these psychometric properties across a variety of populations, including general and chronic pain populations.

Comorbid Medical Conditions. It may be that individuals with medical conditions (in addition to the pain problem) cope differently and with a different outcome than those with only a pain problem. Increasingly, there is recognition by

health researchers that comorbid medical conditions need to be controlled for in their analyses. Comorbidity was assessed using the Comorbidity Questionnaire (Appendix D, pp. 244-246). It is a self-report questionnaire that requires the respondent to rate the self-perceived impact of several comorbidity categories on his or her health. Fifteen categories were addressed by the questionnaire: allergies, high blood pressure, diabetes, headaches, cancer, mental and emotional problems, blood problems, gynaecological problems, disorders of the cardiovascular system, respiratory system, digestive system, musculoskeletal system, urinary system, and neurological system, and other problems. The respondent indicated whether each of these categories was present for them and, if so, how it affected their health. Impact on health is rated on a four point scale (not at all, mild, moderate, and severe).

The psychometric properties of the Comorbidity Questionnaire have been assessed with a sample of 50 individuals from the general Saskatchewan population (Jaroszynski, Cassidy, Côté, Carroll, Yong-Hing, 1998). It was found to be easy to administer and usually well answered. It also captured all intended health problems with expected frequencies. The Comorbidity Questionnaire displayed good concurrent validity. A global score from the questionnaire correlated well with the SF-36 physical and mental health component summary scores. As expected, high scores on the Comorbidity Questionnaire were related to poorer physical and mental health ( $r=-0.62$  &  $-0.48$ ; Jaroszynski et al., 1998).

To score the Comorbidity Questionnaire, each of the 15 categories was converted into a three-point scale (1=do not have; 2=present but has little effect on health-not at all or mild; 3=present and has an effect on health-moderate or severe).

#### 4.2.6 Statistical Analysis

In order to assess the relationship between passive coping and the development of disabling pain, Cox proportional hazards regression analysis was conducted. This form of analysis is suitable when the outcome variable of interest is time until an event occurs (Kleinbaum, 1996). In the present study, the event of interest was the development of disabling spinal pain over a 12-month period. Information was gathered regarding the development of disabling pain at two separate time periods. Thus, the analysis examined the relationship between the use of passive coping strategies and the development of disabling pain at one of two six-month periods (i.e., the model tested the importance of passive coping as a risk factor for disabling spinal pain at 6 and 12 months). The respondents included in the analysis were those who reported the presence of non-disabling spinal pain at baseline or six-month follow-up. The outcome of interest was the time until the development of disabling spinal pain. The exposure of interest is passive coping. Other independent factors were considered as confounders.

This form of analysis was used because it allowed for the use of information from respondents, even when the exact survival time (i.e., time to the event of interest) was unknown. The information from those respondents was “censored”. Respondents who were lost to follow-up or who had not experienced the event of interest by the end of the study were right-censored (Kleinbaum, 1996). Respondents who did not meet the inclusion criteria for the population of interest at the beginning of the study but subsequently met those criteria at some time point during the study were also included. These individuals were left-censored. Thus, Cox regression analysis allowed for the use of respondents who had been censored in the analysis, allowing one to preserve the

cohort structure by including data from those lost to follow-up and those joining the study in progress.

The goal of the analysis was to conduct a phase III risk study, as described by Altman and Lyman (1998) and Côté et al. (2001). The risk factor of interest was passive coping behaviour. Several studies have found passive coping to be associated with negative outcome (e.g., Covic, Adamson, and Hough, 2000; Snow-Turek et al., 1996; Turner, Whitney, Dworkin, Massoth, and Wilson, 1995). However, the independent contribution of passive coping as a risk factor for poor outcome has not been specifically tested. As a result, a confirmatory study was needed to further evaluate the independent importance of passive coping as a risk factor for the development of disabling pain. The importance of passive coping as a risk factor for poor outcome was studied when controlling for other important prognostic factors. In this analysis, the focus was on the exposure factor of coping and, in the discussion of results, the confounders were simply listed as being controlled in the model. Unlike an exploratory model, where all variables (including confounders) are of interest and discussed, in a confirmatory model, confounders are considered important only in that they allow us to estimate the independent effect of the exposure on the outcome.

The analyses were conducted using SPSS. The Proportional Hazards Assumption (PH) must be met when conducting Cox Proportional Hazards Regression Analyses. The PH assumption requires that the hazard ratio (or risk estimate) is constant over time. In other words, the hazard ratio for one participant is proportional to the hazard for another participant, with that proportionality constant independent of time. In the present study, two methods were used to test the proportionality assumption. For categorical variables, a graphical method was employed. In this event, log-log survival



curves were created for each variable. If the plots of the log-log survival curves were parallel, the PH assumption was considered to be met. For continuous variables, the PH assumption was tested by using a time-dependent model. A product term involving time and the variable of interest was created and used in a Cox regression model. If the p value is non-significant (i.e.,  $>0.10$ ), the PH assumption is satisfied. A small p value would indicate that the variable does not satisfy the assumption. All variables under study met the PH assumption. Normality and linearity assumptions were also tested graphically. No variables were considered to have deviated enough from normality to warrant transformation.

In order to develop a model for the relationship between coping and the development of disabling pain, a crude model including only passive coping and the development of disability was run. Steps were then taken to control for confounders. In order to be included as a confounder, the variable must have three necessary characteristics: 1) it must be a risk factor for the disease (i.e., low back pain or neck pain), 2) it must be associated with the exposure under study in the source population (i.e., the population at risk), and 3) it must not be an intermediate step in the causal path between exposure and outcome (Rothman & Greenland, 1998). Thus, potential confounders were identified from previous literature (i.e., a systematic search and critical appraisal of the literature regarding the risk factors for back pain (Study 2) and from a systematic literature review of the risk factors for neck pain) and from preliminary analyses. This approach to modeling is advocated by Rothman and Greenland (1998) and is sometimes referred to as hierarchically well formulated modeling, where “hierarchy” refers to the process of selecting confounders rather than the statistical method of hierarchical regression.

Thus, bivariate models that included both the exposure (passive coping) and possible confounders were examined. Each model was assessed with respect to the change in the exposure estimate of effect obtained with and without the covariate. A 10% change in the estimate of the effect (i.e., the beta weight in the case of the current analysis) was considered an important change, indicating a potential confounder (Rothman & Greenland, 1998). If a variable produced a change of 10% or greater in the exposure estimate, it was included in the model and all variables were again assessed for its impact on the change in the estimate of effect. Once all of the variables were assessed, those found to be important were entered into a full model. This model was then refined by removing one variable at a time to assess its impact on the exposure estimate. Variables that did not produced a change of 10% or greater on the exposure estimate when removed were not included in the final model. Interaction terms between the confounders were also assessed for their impact on the exposure estimate.

It was also important to assess for the presence of non-response bias in the present study. In any type of study, there is the potential for response bias (i.e., respondents to the study differ from non-respondents on important factors). In a longitudinal study, attrition can also result in bias, such that those who remain in the study differ from those who drop out (Fletcher et al., 1988). It is important to assess the presence of this type of bias and control for it when possible. In order to assess for the presence of non-response bias, a comparison of responders and nonresponders to the first follow-up of the Saskatchewan Health and Back Pain Study was conducted. All participants who completed the baseline questionnaire were included in the analyses. The dependent variable was a dichotomous variable indicating response vs. no response to the six-month follow-up. Univariate analyses (analyses of variance and cross-

tabulation) were conducted to identify potentially important variables. Variables identified as important through those univariate analyses were then entered into a logistic regression model. Variables that were significantly associated with non-response at  $p < .05$  were included in the final model. Variables that were found to be significantly associated with non-response were included as confounders in the final model examining the relationship between coping and the development of disabling pain. In this way, the final model was adjusted for variables associated with non-response.

## 4.3 Results

### 4.3.1 Participants

Descriptive information for the study sample ( $N=571$ ) is displayed in Table 4.1. Participants had a mean age of 44.25 ( $SD=12.61$ ). The proportion of men to women was approximately equivalent, although the majority of participants were married (76.8%) and had graduated from high school (74.3%). The distribution of age and gender in the study sample is comparable to the original sample of respondents to the Saskatchewan Health and Back Pain Survey, the distribution of which is comparable to the Saskatchewan Population (Côté, Cassidy, & Carroll, 1998; Côté, Cassidy, & Carroll, 2000). The most frequently reported income was \$20-40,000 (34%) and the majority of participants were working (82.5%). The mean level of perceived health was 64.03. This is slightly below the mean level of general health in the general US population (71.95,  $SD=20.34$ ; Ware et al., 1993). This lower level of general health is to be expected, however, given that the sample used in the present study is composed of individuals in the general population who suffer from chronic pain. The mean passive coping score was 13.68 ( $SD=4.42$ ) and the mean active coping score was 15.92 ( $SD=4.17$ ).

Table 4.1 Descriptive Information for Study#3 Sample at Baseline

Variable	%
Age	44.25 (12.61)*
Gender:	
Male	49.7
Female	50.3
Marital Status:	
Married	76.8
No Longer Married	9.9
Never Married	13.3
Education Level:	
University graduate	15.6
Some post-secondary	32.2
High school graduate	26.5
>grade 8	20.4
<grade 8	5.3
Income:	
>60K	22.3
40-60K	24.5
20-40K	34.0
<20K	19.3
Employment status:	
Working	82.5
Not working	17.5
Passive Coping	13.68 (4.42)*
Low	29.6
Medium	39.6
High	30.8
Active Coping	15.92 (4.17)*
Body Mass Index	26.38 (4.59)*
Depressive Symptoms	10.63 (9.66)*
General Health Status	64.03 (13.79)*
Exercise Frequency	2.85 (2.12)*
Smoking Behaviour:	
Never smoked	48.7
Ex-smoker	26.7
Current smoker	24.5

\*Mean (Standard Deviation)

#### 4.3.2 Non-response Analysis

In order to assess for the presence of non-response bias, a comparison of responders and non-responders to the first follow-up of the Saskatchewan Health and Back Pain Study was conducted. Univariate analyses revealed relationships between response and age, marital status, work status, smoking, and arthritis. Logistic regression analyses revealed that only age had an independent and significant relationship to response (OR=1.03; 95%CI=1.02-1.05). Using a sample of all individuals who participated in the baseline period of the survey, older individuals were more likely to respond to the six-month follow-up. Therefore, the final exposure model was adjusted for age.

#### 4.3.3 Coping and Disabling Pain

Passive coping was significantly associated with the development of disabling neck and/or back pain (crude HRR=1.11, 95%CI= 1.05-1.17). Of the 55 individuals who developed disabling pain, 13% had reported low levels of passive coping, 36% had reported medium levels of passive coping, and 51% had reported high levels of passive coping. In contrast, active coping was not significantly associated with the development of disabling neck and/or back pain (HRR=0.98, 95%CI=0.92-1.05).

Variables that were considered as potential confounders for the relationship between passive coping and the development of disabling pain included age, gender, marital status, education level, income, employment status, active coping strategies, body mass index, depressive symptoms, general health status, exercise frequency, smoking behaviour, and comorbid conditions. All variables met the PH assumption.

Smoking behaviour, general health, cardiovascular problems, and headaches all produced a change of 10% or greater in the exposure estimate of effect. All four

variables were entered into the model. Each variable was then deleted to assess the impact of its removal on the exposure estimate. Removal of smoking had no impact and the variable was removed from further analysis. Interaction terms were also assessed. However, no interaction terms produced a significant change in the exposure estimate. Thus, general health, cardiovascular problems and headaches were identified as important confounders for the relationship between passive coping and the development of pain-related disability. Age was also included in the final model because it was identified as important through the non-response analyses.

After controlling for general health, cardiovascular problems, headaches and age, passive coping continued to have an important relationship with the development of disabling neck and/or back pain (HRR=1.09, 95% CI=1.03-1.15). In order to aid in interpretability, a final step was taken to convert passive coping into tertiles: low passive, medium passive, and high passive. The results of this final model are displayed in Table 4.2. Those individuals who reported a medium level of passive coping strategies were 5.92 (95%CI=2.18-16.1) times more likely to develop disabling pain than people reporting a low level of passive coping. Those individuals who reported high passive coping were 5.05 (95%CI=1.94-13.2) times more likely to develop disabling pain.

Table 4.2 Relationship between passive coping and the development of disabling neck and/or low back pain.

Variable	$\beta$	Hazard Rate Ratio	95% Confidence Interval
Passive Coping:			
Low (Reference)		1.00	
Medium	1.69	5.92	2.18-16.1
High	1.63	5.05	1.94-13.2

\*adjusted for age, general health, cardiovascular problems, headaches, and age.

#### 4.4 Discussion

For individuals in the general population who suffer from non-disabling neck and/or low back pain, the use of passive coping strategies to deal with that pain increases the risk of becoming disabled by the pain. Using medium to high levels of passive coping strategies increases the risk of developing disabling pain five-fold, relative to low levels of passive coping behaviour.

This study extends the previous literature on coping with pain in two ways. First, previous studies were primarily cross-sectional and did not allow for an examination of the predictive value of coping in relation to outcome. In addition, the few longitudinal studies were exploratory in nature. The current study had a longitudinal design and was a confirmatory study (i.e., a study that examined a specific relationship when controlling for important confounders). Thus, the present study further confirms the maladaptive nature of passive coping, which has been indicated in previous studies (e.g., Brown et al., 1989; Graver et al., 1995). It provides strong evidence for passive coping as an important risk factor in the development of disabling neck and/or low back pain.

Second, all previous scientifically admissible studies that examined coping with pain employed samples of pain patients from a variety of sources; primarily pain clinics. The current study is the first and, to our knowledge, only study that sampled the general population for pain sufferers when studying coping with pain. Thus, the present study provides important information about the role of passive coping in the development of disabling pain in pain sufferers from the general population.

The main focus of the study was passive coping. However, active coping was also measured and found to have no crude relationship with the development of

disabling pain. It also did not have a significant impact on the relationship between passive coping and disabling pain. These results are in keeping with the previous literature that found active coping to be unrelated or inconsistently related to measures of adjustment (e.g., Brown et al., 1989; Snow-Turek et al., 1996).

The strong relationship between passive coping and disabling pain, even when other important risk factors are controlled, has enormous clinical implications. This strong relationship identifies passive coping as a marker for risk of disability. This can allow for the identification of individuals at risk and in need of intervention to aid in improving their overall adjustment. The measure of passive coping employed in the current study is brief and can easily be administered to pain sufferers to help identify those at increased risk. Educating the public about the relationship between passive coping and the development of disabling pain may also be important, so as to allow pain sufferers and their support systems to identify these maladaptive strategies and seek help in coping.

The results of the current study do not allow a conclusion regarding causality. However, it does lend credibility to the hypothesis that passive coping plays a causal role in the development of disabling pain. Further study of this relationship is required. If passive coping does play a causal role it would suggest the need to promote decreased use of these strategies in pain sufferers. Current rehabilitation practices promote the use of active coping strategies, with little explicit direction regarding passive coping strategies. The link between passive coping and disability would suggest that an important component of treatment programs might be the control of passive coping strategies. Education of individuals in pain may also be of benefit in order to teach pain sufferers to identify maladaptive strategies and how to decrease their use. If further



studies demonstrate that teaching individuals to decrease their reliance on passive coping strategies has a beneficial effect on their pain and their functioning, programs need to be developed that specifically focus on decreasing passive coping strategies. However, further treatment studies are required to identify key treatment components that can serve this purpose and to assess the impact of decreased use of passive coping strategies.

In addition, it is important to note that not all pain sufferers in the general population will be seeking treatment for their pain. This may be especially true for those individuals who are not disabled by their pain. Because of this possibility, it is important that the information regarding the link between passive coping as a response to pain and onset of disabling levels of pain is disseminated to the public.

The limitations of the present study must be noted. First, high attrition rates resulted in some response bias. Age displayed an independent association with response when other variables were adjusted for. Older individuals were more likely to respond than younger individuals. In order to control for this bias, the final model adjusted for age. Second, the data used for the present study was previously collected data from a study that was not focused primarily on coping. The study was designed to look at risk and prognostic factors for spinal pain, including coping. However, since coping was not the primary risk factor of interest, there may have been other important factors related to coping that were not included in the study (e.g., attributions, coping efficacy, etc.). However, despite this limitation, the available data did allow for a good examination of the research question posed. Finally, the coping questionnaire used in the present study may not have been the best measure of coping available. The two scales of the PMI are brief, composite scales containing various strategies. Other more widely used and well-studied measures of coping, which provide information regarding more specific groups

of coping strategies, are available. The active coping subscale of the PMI is particularly weak with respect to its psychometric properties relative to other measures. However, the PMI has shown adequate validity and reliability, especially the passive coping scale, and its brief nature makes it appealing for survey research.

Despite these limitations, the present study has various strengths that should be noted. It is the first population-based study assessing the role of passive coping as a risk factor for the development of spinal pain. It is a longitudinal study that employed a random sample of a general population. Reliable and valid measures were employed in a confirmatory study design that allowed for the examination of the relationship of interest after controlling for various important confounders. Because of these strengths, the current study does provide important information about the validity of passive coping as an important risk factor for disabling pain. It allows us to conclude that the use of passive coping behaviour is an important predictor of the development of disabling neck and/or low back pain six to twelve months later, even after controlling for important confounding variables.

## **5. STUDY 4: Passive Coping as a Prognostic Factor for Recovery**

## 5.1 Introduction

Individuals who have been involved in a motor vehicle collision and have suffered from whiplash and/or low back injuries are a distinct population of pain sufferers. This population of pain sufferers is unique in that there is a specific event that results in the experience of pain. Following the injury and the development of pain, these individuals strive to cope with and recover from their pain. In addition, there are a variety of other factors that are unique to this pain population. For example, unlike many other pain sufferers, these individuals must deal with an insurance system. These unique factors are likely going to contribute to the outcome of these pain sufferers. There are very few well-conducted research studies that have examined the recovery of these individuals. What role does coping behaviour play in the determination of outcome? This question has not previously been addressed. The present study examined the role of coping behaviour in their recovery. It addressed the question “Does coping behaviour predict recovery from whiplash or low back injuries in a traffic injury claimant population?” This relationship was examined when other potentially confounding factors were taken into account.

## 5.2 Methodology

### 5.2.1 Population

The participants for the present study were taken from A Population-Based, Inception Cohort Study of Traffic Injuries in Saskatchewan (PICSTIS; Appendix E), which was conducted by the Institute for Health and Outcomes Research, University of Saskatchewan (Cassidy et al., 2000). The population included in the PICSTIS study was formed by all personal traffic injury claims that occurred in Saskatchewan from July 1, 1994 to December 31, 1995. Claimants were included in the PICSTIS database if they

were a resident of Saskatchewan and 18 years of age or older. Exclusion criteria for the study were: 1) death as a result of the collision; 2) inability to understand English; 3) serious diseases resulting in an inability to answer the questionnaires; 4) serious associated injuries that resulted in an inability to understand or answer the questionnaires; and 5) Worker's Compensation Claims. The actual number of claimants included in the original population was 9006.

These individuals filled out an Accident Questionnaire (AQ; part of the SGI administrative proof of claim form) and were asked if they would consent to be followed over a one-year period. Participation in the follow-up was voluntary and had no effect on the claim process, since the insurance company was not aware of who did and did not participate. Those who consented were given a Consent Form and an additional questionnaire (CQ) to answer. Those individuals who consented to be in the study were sent a Follow-up Questionnaire (FQ) at six weeks, four months, eight months, and twelve months. Participation was not dependent on having the claim open because the claim procedure was a separate process. Respondents were included into the present study population if they reported either whiplash or low back pain as a result of the collision at baseline (N=7795) and responded to the six-week follow-up questionnaire (N=3119). Claimants were excluded from the study if they had a re-opened claim. Claims could be reopened for administrative reasons, such as making a payment on a bill that arrived late or responding to an inquiry about the file; or for reasons relating to continued or recurrent symptoms. However, any second closure date over-wrote the first closure date on the SGI administrative database available to the study, and no information was provided by SGI regarding the first closure date or the exact reasons for the re-opening of claims. As a result, time on benefits could only be determined

accurately for those claimants who did not have their claims reopened, and only these claimants were included in the analysis. This resulted in 5659 available cases that did not have a reopened claim.

Participants were further limited to include only those who completed the Vanderbilt Pain Management Inventory on the six-week FQ. The six-week follow-up questionnaire was used as baseline for coping because it was the first point at which coping was measured. Coping was not measured at baseline because many individuals made an injury claim the day of or the day after the injury, which did not allow time for coping to develop. Of the 3119 respondents to the six-week follow-up questionnaire, 2513 filled out the coping questionnaire. Six hundred and seven respondents did not complete the coping questionnaire (i.e., they had missing data or they were ineligible because their pain had not reached moderate or greater intensity). The study population, which consisted of those completing the PMI and reporting whiplash only (n=770), low back pain only (n=84), or a combination of both (n=935), included 1789 respondents. Two hundred and sixty-seven of those respondents did not have their claims closed during the study period and the remaining 1522 respondents had their claims closed during the study period (Figure 5.1).

#### 5.2.2 Procedure

Those claimants who consented to be in the study received a Follow-up Questionnaire at six weeks, four months, eight months, and twelve months. Questionnaires were mailed to the study participants one week before the follow-up anniversaries. Those individuals who did not return their questionnaires within 10 days

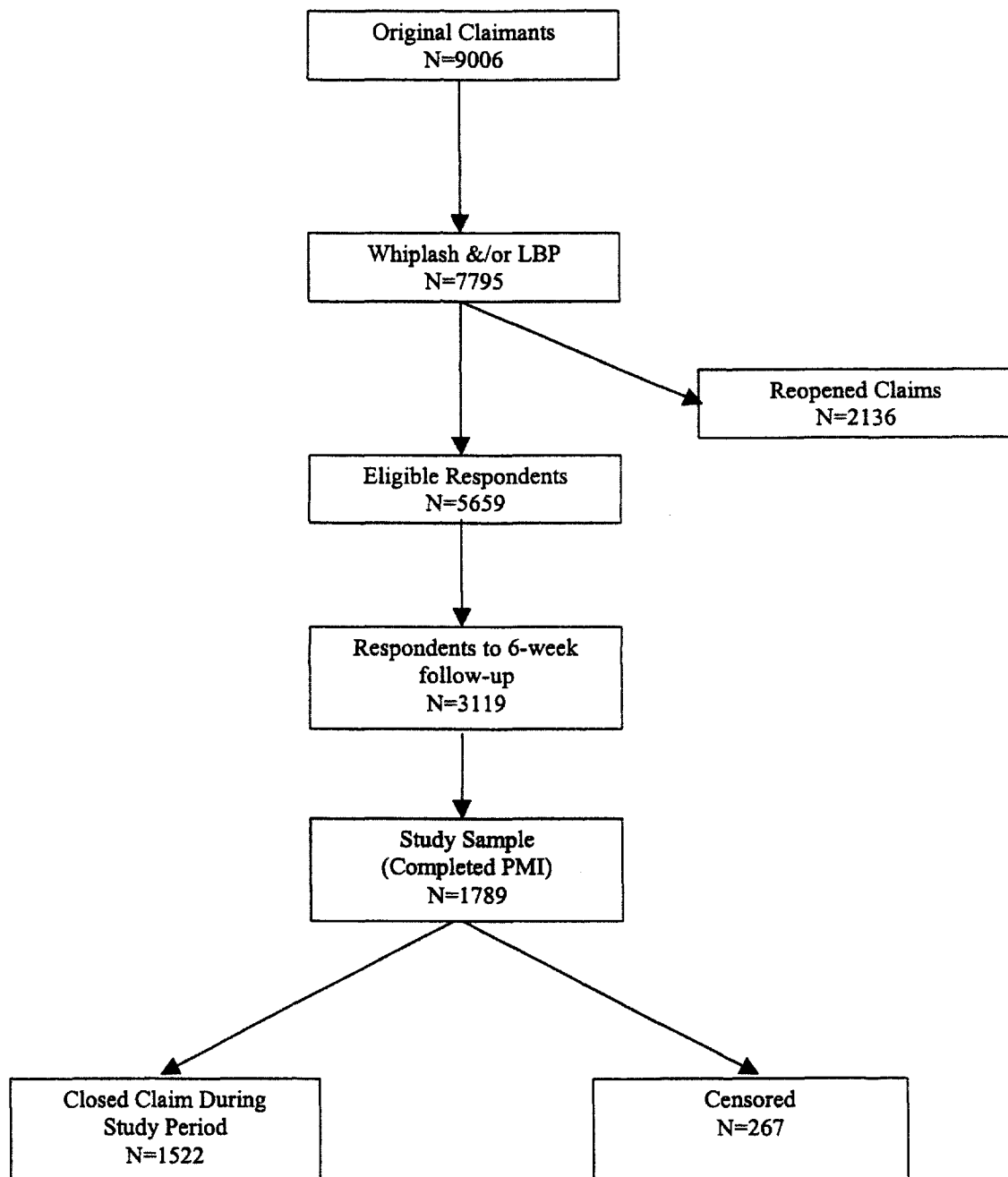


Figure 5.1 Summary of Population and Study Participants

received reminder phone calls to prompt the return of questionnaires. If telephone attempts were unsuccessful, or if the subject indicated that they no longer wished to participate, no further contact was attempted.

### 5.2.3 Outcome Variable

The purpose of the present study was to assess the relationship between coping behaviour and recovery. Recovery is a complex construct that has been measured in a variety of ways. Beaton, Tarasuk, Katz, Wright, and Bombardier (2001) conducted a qualitative study that examined the concept of recovery in pain sufferers. They found three constructions of “being better”. One construction that they described involved a resolution of the disorder. In discussing recovery, individuals who adopted this construct referred to recovery as a change in their health state. This resolution could involve a complete resolution (i.e., the disappearance of pain) or a change in magnitude (i.e., a decrease in pain intensity). Resolution of the disorder could also be conceptualized as a change in threshold (i.e., a decrease of pain intensity to a level that can be ignored). A second construction of recovery involved a readjustment of life to accommodate the disorder. This construction viewed “being better” as a state in which the person was able to adjust their life so as to live around the pain. The third construction of recovery involved redefining the meaning of such concepts as self and health. In this concept of “being better”, pain becomes a part of your life and may be viewed as the “normal” state. These three constructions identified by Beaton et al. (2001) highlight the complex nature of the concept of recovery. They go further to stress the importance of being aware of the full experience of the disorder when discussing recovery. In other words, the experience of pain is more than the physical intensity of that pain. The emotional, social, and functional impact of pain on all aspects



of the persons life affect the person's experience of the pain and experience of recovery. It is clear, then, that the use of a simple measure, such as pain intensity, fails to capture the complexity of the recovery construct. One must assess multiple aspects of the pain experience in order to assess its recovery.

A marker of "recovery" commonly used in insurance studies is time to claim closure (Spitzer et al., 1995). This is measured as the time, in days, from the date of the injury to the date of claim closure, which marks the end of payments for medical treatment or income replacement benefits. This is an administrative outcome that has some appeal when studying issues such as costs associated with traffic or work related injuries. However, before it could be considered as an informative outcome in a health-related study such as this, the association between time to claim closure and various indices of health recovery had to be considered.

The association between health improvement and claim closure in this population has been reported in the literature previously, and is briefly outlined here (Cassidy et al., 2000; Côté et al., 2001). The relationships between decreases in pain intensity, improvements in physical functioning, improvements in depressive symptoms, and time on benefits were assessed using multivariable time-varying extended Cox Proportional Hazard models. After adjusting for important demographic and socio-economic factors, baseline measures of injury severity, previous history of injury and other important baseline factors, a 10mm improvement in pain (measured on a 100mm VAS) was associated with a 13-24% increase in rate of claim closure during the course of a one-year follow-up. An improvement in physical functioning of 10 points (on a 100 point scale) was associated with a 10-35% increase in rate of claim closure (depending on the follow-up period) and the rate of claim closure was 36-37% faster when

depression improved. Therefore, rate of self-reported recovery in pain intensity, physical functioning and mood were important and independent predictors of length of time on benefits.

There are arguments against using time to claim closure as a measure of recovery. Some may argue that it is an arbitrary measure that has no clinical significance. It is an administrative measure that may be impacted by factors other than the claimant's health and well-being. Also, the closure of a claim does not necessarily mean that a person has "recovered fully". However, the study described above does lend confidence to the association between indices of improvement (i.e., pain, depression and physical functioning) and speed at which claims were closed. In addition, using claim closure has the advantage of not necessitating the author to make an arbitrary choice of "recovery event" (i.e., one facet of recovery did not have to be chosen over others). Instead "recovery" is seen as a dynamic process and a measure found to be significantly associated with several facets of recovery is the recovery concept of interest.

In the present study, other outcome measures were available. Measures of depression, pain intensity, and pain-related disability were all available as outcome variables. However, the number of available participants who completed all measures was significantly lower than the numbers available with time to claim closure. For example, the use of depression as an outcome variable following a twelve-month follow-up period would have resulted in a sample of 1550 participants, which is a loss of 239 participants. The use of pain-related disability as an outcome measure would have resulted in 1197 participants, which is a loss of 592 participants. Although this lower number does not result in an important loss of statistical power to detect an effect, it is

unlikely that drop-outs occurred at random. This selective loss of participants over time would have subjected the remaining sample to selection bias, with a consequent threat to the internal validity of the study. Given these considerations and the demonstrable association between rate of health improvement and rate of claim closure, and the advantage of having claim closure information on all subjects (apart from re-opened claims), it was the author's decision to use claim closure as the outcome of interest in this study.

#### 5.2.4 Exposure Variable

The exposure variable, or variable of primary interest, in the present study was coping behaviour. The PMI was used to assess coping behaviour in the present study, as well. However, in this study, the 18-item PMI was used to assess coping behavior (Appendix E, pp. 292-293). In the 18-item version of the PMI, the Passive Coping scale consists of items 2, 6, 7, 9, 10, 11, 13, 15, 16, 17, and 18. The Active Coping scale consists of items 1, 3, 4, 5, 8, 12, and 14. The psychometric properties of this version of the PMI were presented in the methodology section of Study 3.

#### 5.2.5 Potential Confounders

The following groups of variables were considered for inclusion in the model for recovery.

##### 5.2.5.1 Pain-Related Factors

Several pain-related factors were assessed in Study 4. The factors included were location of pain, percentage of body in pain, pain intensity, pain-related disability, and pain-related emotions.

Pain Location. Participants of the PICSTIS study were included in the present analysis if they reported whiplash or low back pain as a result of the collision.

Individuals were classified as whiplash sufferers if they reported neck/shoulder pain as a result of the collision, responded yes to either neck/shoulder pain (item #1) or reduced/painful neck movement (item #2) on the symptom checklist. Individuals were excluded if they were in the hospital for more than two days because that was taken as a sign of a more serious injury. While coping behaviour may still be relevant to these individuals, the more serious nature of the injuries may focus the coping behaviour on issues other than pain. These individuals were excluded because our primary focus was on coping with pain. Claimants were also excluded from the whiplash group if they were in a non-vehicle related collision. Pedestrians and cyclists were excluded because it is likely that different physiological mechanisms are involved in these non-vehicle related collisions.

Individuals were classified as suffering from low back pain if they responded in the affirmative to the low back pain item on the symptom checklist and if they indicated pain in the lumbar area on the pain drawing. The pain drawing includes a line drawing of the front and back of the human body. Participants are asked to mark the areas in which they feel pain. This measure is the most widely used instrument to assess pain location (Jensen & Karoly, 1994). The scoring system divides the drawings into 45 anatomical areas (Margolis, Tait, & Kraus, 1986). Pain drawings are scored by placing a clear, plastic template containing the boundaries of the anatomical areas. Individuals were categorized as having low back pain if they marked the areas that are indicative of lumbar and/or sacral pain.

Percentage of Body in Pain. Percentage of body in pain was measured using the pain drawing described above. A weighting procedure was used to estimate total percentage of body surface that the patient shades as painful. This method of scoring

pain drawings was found to have high inter-rater reliability and high test-retest reliability (Margolis et al., 1986).

Pain Intensity. Pain intensity was measured on a 10cm visual analogue scale (VAS). The scale anchors ranged from “no pain” to “pain as bad as it could be”. Individuals were asked to indicate how severe their pain was now and usually (over the last two weeks) for neck/shoulder pain, headaches, and pain in other regions. Responses were categorized into five 20mm intervals.

Pain-Related Disability. Pain-related disability was assessed using the Pain Disability Index (PDI; Pollard, 1984; Appendix E, p.291). The PDI is a seven-item scale that was designed to measure the extent to which pain interferes with various areas of activity. The seven areas of activity included are family/home responsibility, recreation, social activity, occupation, sexual behaviour, self-care, and life-support activity. Participants rate the extent to which pain interferes with these areas on a graphic rating scale. The anchors on the scale are no disability (0) and total disability (10). The scores for each item are summed to yield a total score that ranges from 0 to 70. The total score provides a brief global measure of self-perceived disability, with higher scores reflecting greater perceived disability. In the present study, the total score was categorized into ten point intervals. Because of the skewed distribution of this variable in this sample and the resulting small number of participants with scores in the higher levels, the top three groups were combined to form five categories (1-9, 10-19, 20-29, 30-39, 40-70).

The PDI has demonstrated reliability and validity. Internal consistency has been found to be 0.87 (Tait, Pollard, Margolis, Duckro, & Krause, 1987) and test-retest reliability has ranged from 0.91 for a one week interval (Gronblad et al., 1993) to 0.44

for a two-month interval (Tait, Chibnall, & Krause, (1990). Validity has been demonstrated in comparisons of inpatients and outpatients. Inpatients in pain treatment program have been found to have significantly higher disability scores than outpatients (Tait et al., 1987). Scores on the PDI have also been found to be associated with various measures of psychological distress (e.g., anxiety, depression). High PDI scores have also been associated with more self-reported pain and more disability-related behaviours (Jerome & Gross, 1991; Tait et al, 1990).

The Pain Disability Index is a brief, valid, and reliable measure of disability that is not tied to a particular form of pain. In addition, it is a global measure of disability that provides a broad-based sampling of disability areas. For these reasons, it was selected as the measure of disability for the present study.

Pain-Related Emotions. Individuals suffering from pain may experience a wide variety of emotions. In the present study, the emotions of frustration, fear, anger, anxiety, and depression were assessed. Visual analogue scales were used to measure these emotions (Appendix E, p.284). The anchors were “none” and “the most severe imaginable”. Participants were asked to indicate how anxious/angry/frustrated/fearful/depressed they feel about their pain.

#### 5.2.5.2 Sociodemographic Factors

The sociodemographic variables that were examined included age, gender, marital status, highest education level, family income, employment status, and main work activity. These variables were measures in the same manner used in the SHBP survey (Study 3).

#### 5.2.5.3 Depressive Symptoms

The presence of depressive symptoms was assessed using the Centre for Epidemiological Studies Depression Scale (CES-D; Radloff, 1977).

#### 5.2.5.4 Health-Related Factors

The health related variables that were included in the study were subjective health status and smoking behaviour. Subjective health status was assessed using the General Health subscale of the SF-36. Participants were asked whether or not they smoked cigarettes, how many years they smoked cigarettes, and how many cigarettes they smoke per day. Participants were categorized as smoker or non-smoker.

#### 5.2.5.5 Collision Characteristics

Information regarding the collision was gathered at the time of the initial claim (Appendix E, pp.267-268). These characteristics included time of collision (night, day, sunrise, or sunset), position in vehicle, main direction of impact (front, rear, driver's side, passenger's side), head position at moment of impact (straight forward, turned to right, turned to left, do not know), type of road that the collision occurred on (provincial highway, rural road, urban street, private property, other, or do not know), and condition of road surface (dry, wet, icy). The person was also asked whether or not their vehicle rolled over, their car was stopped at the time of the collision, and their vehicle was drivable after the collision (yes, no, or don't know). In addition, the person was asked whether or not the seat belt was fastened, what type it was (lap or lap and shoulder), whether or not there was a headrest and what type that was (fixed, adjustable, unknown). The individual is also asked whether they have hired a lawyer to help with their claim. Two final collision-related variables were whether or not the person was considered

responsible for the collision and whether the claim was made under the Tort or No Fault insurance system.

#### 5.2.5.6 Current Symptoms

The symptoms that the respondents were reporting were also considered as potential confounders. These symptoms were assessed at the six-month follow-up, concurrent with the pain coping information obtained. Symptoms examined included neck/shoulder pain, reduced neck movement, headache, jaw movement, pain in arms or hand, pain in legs or feet, dizziness, ringing in the ears, memory problems, concentration problems, vision problems, and lower back pain. All symptom variables were dichotomous, indicating the presence or absence of the symptom.

#### 5.2.6 Statistical Analysis

In order to assess the relationship between passive coping and recovery (as approximated by time to claim closure) Cox proportional hazards regression analyses were conducted. This form of regression analysis is used to assess the relationship between several independent variables and the dependent variable when the dependent variable is the time to a particular event. Time to an event analysis was suitable for this data because there were censored events. Some participants did not close their claim prior to the end of the study. As a result, it is unknown at which point they reach that event. These survival times are called “censored” to indicate that the period of observation was cut off before the event of interest occurred (Altman, 1991). Cox regression analysis allowed for the use of participants who had been censored in the analysis. It also provided the relative risk for each independent variable entered into the equation.



In the present study, the event of interest was claim closure. Thus, Cox regression analysis allowed for the examination of the relationship between passive coping and the time to claim closure after controlling for confounding factors. Coping behaviour was initially assessed in the six-week follow-up questionnaire. Thus, this measure of coping served as the baseline. Information regarding psychosocial, health and pain status were all taken from the same questionnaire. Information regarding sociodemographic factors and collision characteristics were taken from the initial questionnaire.

The goal of the analysis was to conduct a phase III prognostic study, as described by Altman and Lyman (1998). The prognostic factor of interest was passive coping behaviour. Several studies have found passive coping to be associated with outcome (e.g., Covic et al., 2000; Snow-Turek et al., 1996; Turner et al., 1995). However, the independent contribution of passive coping as a risk factor for positive outcome has not been specifically tested. As a result, a confirmatory study was needed to further evaluate the independent importance of passive coping as a prognostic factor for recovery. The importance of passive coping as a prognostic factor for recovery was studied when controlling for other important prognostic factors.

Passive Coping and all potential confounding factors were tested to assess whether or not they met the proportional hazards assumption. These tests were conducted in the same way as was described in Study 3. All variables met this assumption.

In order to develop a model for the relationship between coping and recovery, a crude model including only passive coping and time to claim closure was run. Potential confounders were identified in the same manner described for Study 3. However, in this

analysis, all potential confounders were grouped within domains. For the present study, five domains were included: sociodemographic factors, health-related variables, pain-related variables, symptoms, and collision-related factors. Correlations were calculated for the variables within each domain in order to deal with potential collinearity. If two or more variables were highly correlated ( $r > 0.3$ ), a decision was made regarding which of the variables best measured the construct of interest. Then, crude models were run for each variable within each domain. Potential confounders within each domain were identified in the manner described for study 3. This was repeated for each domain. Finally, all important variables from the multivariate domain-specific models were included in the final model. This final model was then refined by removing one variable at a time to assess its impact on the exposure estimate. Variables that did not produce a 10% change or greater when removed were not retained for the final model (Rothman & Greenland, 1998). Interaction terms between confounders were also examined.

In order to assess for the presence of non-response bias, a comparison of responders and nonresponders to the first follow-up of the PICSTIS database was conducted. Individuals were considered to be responders if they completed the PMI in the first follow-up questionnaire. Univariate analyses (analyses of variance and cross-tabulation) were conducted to identify potentially important variables from the information collected at baseline (AQ). Variables identified through univariate analyses as having a relationship to non-response were then included into a logistic regression model. All variables having a significant association with non-response ( $p < .05$ ) were included in the final model. Variables that were found to be important through these analyses were included as confounders in the final Cox model examining the relationship between coping and time to claim closure. The adjusted hazard rate ratio

and its 95% confidence interval is reported. In addition, to aid in the interpretation of this value, passive coping scores were divided into tertiles, and the adjusted hazard rate ratio and 95% confidence intervals of moderate and high levels of passive coping (in reference to low levels of passive coping) are reported.

### 5.3 Results

#### 5.3.1 Participants

Descriptive information about the study sample is presented in Table 5.1. The average age of participants was 37.46 (SD=14.59). The sample consisted of more women (65.1%) and married individuals (57.5%). The majority of participants graduated from high school (78.2%) and were employed (88.6%). The two most frequently reported family incomes were less than \$20,000 (34.9%) and \$20-40,000 (33.9%). The demographic information for the study sample was similar to that of the original sample of respondents with whiplash and/or low back pain who completed the PMI at the six-week follow-up (N=2513). The mean level of passive coping was 29.18 (SD=7.92) and the mean level of active coping was 20.37 (SD=4.80). The mean level of coping was comparable to that of the original sample. Collision-related information (Table 5.2), pain-related information (Table 5.3) and current symptoms (Table 5.4) are also displayed. The study sample was similar to the original sample with respect to collision-related factors, health-related factors, pain-related factors, and current symptoms.

#### 5.3.2 Non-response Analysis

In order to assess for the presence of non-response bias, individuals who responded to the six-week follow-up questionnaire and completed the PMI were compared to non-responders (non-participants). Univariate analyses revealed

Table 5.1 Descriptive Information for Study#4 Sample

Variable	%
Age	37.46 (14.59)*
Gender:	
Male	34.9
Female	65.1
Marital Status:	
Married	57.5
No Longer Married	11.3
Never Married	31.1
Education Level:	
<grade 8	4.4
>grade 8	17.4
High school graduate	27.6
Some post-secondary	38.7
University graduate	11.9
Income:	
<20K	34.9
20-40K	33.9
40-60K	19.2
>60K	12.1
Employment status:	
Working	88.6
Not working	11.4
Passive Coping	29.18 (7.92)*
Low	32.8
Medium	34.0
High	33.1
Active Coping	20.37 (4.80)*
Body Mass Index	25.55 (5.06)*
Depressive Symptoms	16.65 (11.97)*
General Health Status	67.53 (19.50)*
Smoking Behaviour:	
Non-Smoker	69.1
Current smoker	30.9

\*Mean (Standard Deviation)

relationships between response and age, gender, marital status, employment status, insurance system, lawyer involvement, and a variety of collision-related variables (collision time, seat position, impact direction, vehicle roll over, type of road, car stopped, seat belt, head rest, head position). Logistic regression analyses revealed a significant relationship between participation and gender, marital status, employment status, and lawyer involvement (Table 5.5). Women were more likely to participate than men and married individuals were more likely to participate than those who were never married or were no longer married. Compared to those who were working full time, students and homemakers were less likely to participate. Individuals involved with a lawyer were also less likely to participate in the six-week follow-up.

### 5.3.3 Coping and Recovery

Crude analysis found passive coping to be associated with time to claim closure at  $HRR=0.964$ ,  $95\%CI=0.958-0.970$ . In other words, a one-point increase in passive coping resulted in rate of claim closure being slower (decreased) by 3.6%. When passive coping was divided into tertiles for ease of interpretation, scores of 11 to 25 were included in the low passive coping category, scores of 26 to 32 were included in the medium passive coping category, and scores of 33 to 55 were included in the high passive category. Medium and high levels of passive coping were associated with longer time to claim closure relative to low levels of passive coping (Table 5.6). Rate of claim closure decreased by 33% for those reporting medium levels of passive coping while it decreased by 48% for those reporting high levels of passive coping, when compared to those reporting only low levels of passive coping. The median number of days to claim closure was 228 for individuals reporting low levels of passive coping.

Table 5.2 Collision-Related Information for Study#4 Sample

Variable	%
Collision Responsibility:	
Not Responsible	87.0
<50% Responsible	0.7
> or = 50% Responsible	12.3
Insurance System:	
Tort	43.0
No-Fault	57.0
Lawyer Involvement	23.2
Time of Collision	
Day	69.0
Sunrise	3.9
Sunset	7.2
Night	20.0
Type of Road	
Provincial Highway	13.5
Rural Road	5.2
Urban Street	78.3
Private Property	0.6
Other Location	1.7
Road Surface	
Dry	63.4
Wet	9.3
Icy	27.3
Seat Position	
Driver	75.9
Front Passenger	20.3
Other Passenger	3.9
Impact Direction	
Front	26.1
Rear	42.6
Driver side	17.4
Passenger Side	13.8
Vehicle Rolled Over	4.8
Vehicle was Drivable After the Collision	56.4
Vehicle was Stopped At the time of the Collision	42.6
Seat Belt:	
Lap and Shoulder	92.6
Lap	4.8
None	2.6

Head Rest:	
Fixed	23.0
Adjustable	52.5
Unknown type	7.4
None	17.1
Head Position at time of Collision	
Straight Forward	63.1
Turned to Right	16.0
Turned to Left	20.9
Loss of Consciousness	
Uncertain	6.5
Yes	4.6
Hit on the Head	
Uncertain	13.4
Yes	27.2
Broken Bones	
Uncertain	2.9
Yes	3.7

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For those individuals reporting medium and high levels of passive coping, the median time to claim closure was 357 and 432 days, respectively. In contrast, active coping was not associated with time to claim closure (HRR=1.00, 95%CI=0.99-1.01).

Potential confounders to the relationship between passive coping and time to claim closure within each domain were identified. None of the variables within the sociodemographic domain were identified as potential confounders. Within the collision-related domain, only lawyer involvement was retained as a confounder. Depressive symptomatology was retained within the health-related domain. Within the symptoms domain, reduced neck movement and concentration problems were identified as confounders. Finally, pain-related disability, pain-related frustration, percentage of pain in the body, neck and shoulder pain resulting from the collision, current neck pain

Table 5.3 Pain-Related Information for Study#4 Sample

Variable	%
Whiplash	95.3
Low Back Pain	57.0
Initial Service Provider:	
None	3.2
Medical Doctor	68.1
Chiropractor	6.1
Medical Doctor and Chiropractor	12.2
Medical Doctor and Physical Therapist	10.4
Percentage of Body in Pain	
0-9.9%	27.0
10-19.9%	34.0
20-29.9%	21.6
30-39.9%	7.7
40-100%	9.7
Current Neck Pain Intensity	
0-19	22.2
20-39	24.9
40-59	21.7
60-79	22.3
80-100	9.0
Usual Neck Pain Intensity	
0-19	29.5
20-39	22.3
40-59	20.4
60-79	19.5
80-100	8.4
Current Headache Intensity	
0-19	50.0
20-39	15.4
40-59	12.7
60-79	13.5
80-100	8.3
Usual Headache Intensity	
0-19	47.9
20-39	14.7
40-59	13.8
60-79	15.1
80-100	8.6
Current Intensity of Other Pain	
0-19	44.1
20-39	15.6
40-59	15.4
60-79	17.1
80-100	7.8



Usual Intensity of Other Pain	
0-19	48.4
20-39	13.2
40-59	15.9
60-79	14.5
80-100	8.1
Pain-Related Disability	
1-9	21.0
10-19	20.7
20-29	18.6
30-39	17.3
40-70	22.4
Pain-Related Emotions:	
Anger	43.90 (32.69)*
Fear	33.66 (30.76)*
Frustration	53.88 (32.25)*
Anxiety	38.82 (27.15)*
Depression	33.96 (32.09)*

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\*Mean (Standard Deviation)

intensity, usual neck pain intensity, current headache intensity, usual headache intensity, and current intensity of other pain were identified as confounders within the pain-related domain. The full multivariate model included pain-related disability, pain-related frustration, percentage of body in pain, current headache intensity, current neck pain intensity, usual headache intensity, usual neck pain intensity, usual “other” pain intensity, neck/shoulder pain from the collision, reduced neck movement, concentration problems, depressive symptoms, and lawyer involvement as confounders. Usual headache intensity, usual neck pain intensity, and the presence of neck/shoulder pain were removed from the equation due to their redundancy and collinearity problems with other variables (i.e., current headache and current neck pain intensity). The ten variables (pain-related disability, pain-related frustration, percentage of body in pain, current headache intensity, current neck pain intensity, current “other” pain intensity, reduced

Table 5.4 Symptoms Reported by Study #4 Sample

Variable	%
Neck/Shoulder Pain	91.6
Reduced/Painful Neck Movement	70.2
Headache	72.7
Reduced/Painful Jaw Movement	15.9
Feelings of Numbness, Tingling or Pain in Arms or Hands	38.5
Feelings of Numbness, Tingling or Pain in Legs or Feet	28.2
Dizziness or Unsteadiness	34.6
Ringling in the Ears	20.3
Memory Problems	21.0
Concentration Problems	34.4
Vision Problems	15.0
Lower Back Pain	73.7

neck movement, concentration problems, depressive symptoms and lawyer involvement) were further assessed with respect to their effect on the relationship between the exposure and the outcome. They were entered into an equation with passive coping as a block and subsequently removed one at a time to assess their impact on the exposure estimate. Only seven variables (pain-related disability, pain-related frustration, current neck pain intensity, current “other” pain intensity, reduced neck movement, concentration problems, and depressive symptoms) importantly confounded the exposure-outcome relationship. Next, an examination of interaction terms between these identified confounders was conducted. None of these interactions were retained because they had no impact on the relationship between passive coping and time to claim closure. Therefore, the final model included the seven confounding variables listed above.

Table 5.5 Results of Logistic Regression Examining Non-Response Bias

Variable	$\beta$	Hazard Rate Ratio	95% Confidence Interval
Gender	0.47	1.60	1.44-1.79
Marital Status			
Married		1.00	
Never Married	-0.13	0.88	0.79-0.99
No longer married	-0.20	0.82	0.70-0.95
Employment Status			
Full time		1.00	
Student	-0.19	0.83	0.68-0.99
Part time	-0.04	0.96	0.84-1.09
Homemaker	-0.42	0.66	0.55-0.78
Retired	-0.08	0.93	0.74-1.15
Unemployed	-0.12	0.89	0.73-1.09
Lawyer Involvement	-0.89	0.41	0.34-0.49

After controlling for pain-related disability, pain-related frustration, current neck pain intensity, current “other” pain intensity, reduced neck movement, concentration problems, and depressive symptoms, the relationship between passive coping and time to claim closure became weaker (HRR=0.99, 95%CI=0.98-1.00). A one-point increase in passive coping predicted a 1% decrease in rate of claim closure. This relationship is more clearly displayed when passive coping is converted into tertiles (Table 5.6). Individuals falling into the medium passive coping category (HRR=0.88, 95%CI=0.76-1.01) and individual falling into the high passive category (HRR=0.89, 95%CI=0.75-1.05) had a 12% and 11% decrease in rate of claim closure, respectively.

When the variables identified as important through the non-response analyses (gender, marital status, employment status, and lawyer involvement) were also forced into the final model, the predictive relationship between passive coping and time to

Table 5.6 Relationship between Passive Coping and Time to Claim Closure

Variable	Crude Hazard Rate Ratio (95% Confidence Interval)	Adjusted Hazard Rate Ratio* (95% CI)	Adjusted Hazard Rate Ratio** (95%CI)
Passive Coping			
Low (Reference)	1.00	1.00	1.00
Medium	0.67 (0.59-0.75)	0.85 (0.76-1.01)	0.88 (0.77-1.01)
High	0.52 (0.46-0.59)	0.89 (0.75-1.05)	0.90 (0.77-1.07)

\*Adjusted for confounders: pain-related disability, pain-related frustration, current neck pain intensity, current "other" pain intensity, reduced neck movement, concentration problems, and depressive symptoms.

\*\*Adjusted for non-response variables (gender, marital status, employment status, lawyer involvement) and the above confounders.

claim closure remained weaker than the crude relationship (adjusted HRR=0.996, 95%CI=0.987-1.006). This means that a one-point increase in passive coping behaviour resulted in a slower rate of claim closure by 0.4%. When passive coping was converted into tertiles, individuals falling into the medium passive coping category (HRR=0.884, 95%CI=0.770-1.014) and individuals falling into the high passive category (HRR=0.904, 95%CI=0.765-1.068) showed a 12% and 10% (respectively) decrease in rate of claim closure.

## 5.4 Discussion

Passive coping was found to have a small crude relationship with time to claim closure in a sample of individuals who were suffering from whiplash and/or low back pain due to a motor vehicle collision. However, the prognostic role of passive coping in recovery became weaker when other important predictors were accounted for. The point

estimate of medium to high levels of passive coping in predicting the outcome was about a 10% decrease in the rate of claim closure.

It should be noted that when interpreting these findings in the light of the classical concept of statistical significance using a p value of 0.05, the adjusted relationship between passive coping and time to claim closure was statistically non-significant (i.e.,  $p > .05$ ). That is, given the variability in the data, an effect size of at least the magnitude and variability found in this study between the exposure and the outcome has a greater than 5% chance of occurring at random (in the absence of an actual relationship). An equivalent method of assessing this is through an examination of whether the 95% confidence interval includes unity. Had the usual p-value of 0.05 been set a priori in this study, classical statistics would lead us to fail to reject the null hypothesis (of no relationship).

More recently, an alternative way of interpreting findings has been advocated by a number of methodologists and biostatisticians (e.g., Rothman, 2002). This orientation does not use statistical significance to evaluate the importance of research findings, nor are confidence intervals used as a proxy for statistical significance. Rather, based on the likelihood principle, the magnitude of the point estimate is examined, and the confidence intervals are used to evaluate the precision with which we can measure that estimate. The probability of the “true value” of the effect falling within the confidence intervals is 0.95; however, the probability of that “true” value is not evenly distributed within that confidence intervals, but is greatest at the point estimate. Using this interpretation of the current data, it could be said that there is a weak (0.88 – 0.90), but relatively precise independent relationship between passive coping and rate of recovery (claim closure).

The present findings contribute to the existing literature in two ways. First, passive coping as a prognostic factor for recovery has not been previously studied in people suffering from pain resulting from motor vehicle collisions. Thus, the present study provides important information regarding coping in this pain population. Second, the findings contribute to the coping literature and further confirm the maladaptive nature of passive coping behaviour.

Although the main focus of the study was passive coping behaviour, active coping was also assessed. It is of interest to note that active coping did not have an important crude relationship with time to claim closure. It also had no significant impact on the relationship between passive coping and time to claim closure. This finding is consistent with the results from the previous study with pain sufferers in the general population (Study 3). It continues to point to the decreased impact of active coping relative to the use of passive coping strategies.

The current research results extend the previous findings regarding the maladaptive nature of passive coping behaviour to this population of pain sufferers. Similar to findings with other groups of pain sufferers, passive coping is –predictive of a negative outcome. The clinical implications of this finding are clear. Passive coping can be considered a marker for a slower rate of recovery. One element of passive coping behaviour is the limitation of activities by pain. A recent study examined the impact of certain aspects of the pain experience on long-term pain distress in motor vehicle collision victims (Olsson, Bunketorp, Carlsson, & Styf, 2002). They found a measure of interference (i.e., the level at which pain is perceived to interfere with daily activities) to be the only factor predictive of neck pain one year following the motor vehicle collision, after adjusting for age, sex, and severity of condition. This finding is consistent with the

current study's conclusions about passive coping behaviour. It suggests that pain coping strategies that allow pain to interfere with daily functioning are predictive of poor recovery (i.e., continued pain).

Many of the treatment programs that are in place for these pain sufferers likely focus on an active approach to rehabilitation. Further research is needed to continue to clarify the role of passive coping behaviour in this pain population, and the role that treatment directed at passive coping can play. Research that focuses on the impact of treatment on coping behaviour and the impact of changes in passive coping behaviour on subsequent adjustment is also needed.

Unlike some other research findings, passive coping was found to have a relatively weak relationship with outcome. For example, passive coping was found to be a more important risk factor for disabling pain in the general population (Study 3) than it was a prognostic factor in the recovery from whiplash/low back pain that resulted from motor vehicle collisions. These results suggest that there are other important factors besides passive coping that are impacting on claim closure. Cassidy et al. (2000) identified several factors (e.g., lawyer involvement, neck pain intensity, and percentage of body in pain) that were associated with time to claim closure in whiplash sufferers. The role of coping behaviour in predicting claim closure may be less important than these types of factors, some of which are unique to this pain population. The unique nature of the population, with a distinct causal event for the pain, an insurance system, and potential lawyer involvement, may be key reasons why the role of passive coping behaviour is less salient in recovery.

As discussed previously, recovery is a complex construct with many facets. Passive coping behaviour appears to play a less important role in the prediction of this

particular measure of recovery. However, given the multifaceted nature of recovery, passive coping may be a stronger predictor of other facets of recovery. Passive coping was a significant risk factor for disability in the general population. It may well be that passive coping has a more important relationship in predicting factors like disability, depression, or pain intensity when studied directly. In other words, it may be more strongly associated with some facets of recovery over others. The present findings indicate that passive coping is a weak indicator of a poor prognosis. Further study is required to elucidate the role that passive coping behaviour plays in leading to that negative outcome.

Several limitations to this study must be noted. First, the attrition rates in longitudinal studies must be considered with respect to the potential for response bias. Although there was no selective attrition in this study (i.e., the outcome used was available for all participants who did not re-open their claims), there was selective non-participation in that not all individuals sustaining a traffic injury agreed to participate. Therefore, the sample at risk in this study (individuals who participated in the first follow-up) is subject to selection bias by gender, marital status, employment status and lawyer involvement. These variables were controlled in the equation in order to statistically control for response bias, however, it is unclear whether this strategy can sufficiently address this bias. Second, the coping questionnaire used in the present study may not have been the best measure of coping available. The two scales of the PMI are brief, composite scales containing various strategies. Other more widely used and well-studied measures of coping, which provide information regarding more specific groups of coping strategies, are available. However, the PMI has shown adequate validity and reliability, especially the passive coping scale, and its brief nature makes it appealing for



survey research. Third, our exclusion criteria resulted in several “groups” being excluded from our sample. Thus our findings may not be generalizable to those under the age of 18; those who suffered a motor vehicle injury but did not make a personal injury claim, did not seek health care and did not claim for time off work; those suffering injuries other than whiplash or low back injuries; and those whose claims were closed, then re-opened due to recurrence or continuation of symptoms. Finally, the measure of recovery may not have been the best indicator of recovery. As previously discussed, recovery is multifaceted. The measure of time to claim closure has been found to be associated with several indices of recovery. However, the relationship between passive coping and more directly assessed indices of recovery may differ. Coping may be more predictive of certain facets of recovery. However, the present study did allow us to effectively study the role of passive coping in predicting a valid and commonly used indicator of recovery in insurance studies. Further study of the role of coping in other facets of recovery is still required.

Despite these limitations, the present study provides important information regarding coping behaviour and outcome in individuals suffering from whiplash and/or low back pain due to a motor vehicle collision. It highlights the consistently negative relationship between passive coping and outcome measures. It also identifies passive coping as an important, albeit weaker, prognostic factor of recovery in this pain population that continues to require further study.

## 6. DISCUSSION

Coping can be conceptualized as a process that involves flexible and planned responses to a stressor. Pain is a significant stressor that affects many individuals. The coping behaviour exhibited by individuals in response to pain is affected by many factors and, in turn, can affect health and well-being. The four studies described in this document examined the experience of pain and the role of coping behaviour in that experience. They have provided important insights into the role of coping behaviour in the adjustment of pain sufferers, as well as support for the theory of coping as a process variable.

### 6.1 Passive Coping

Passive coping behaviour has been defined as coping responses that allow the pain to affect other areas of life or allow others to take control of pain management (Brown & Nicassio, 1987). By definition, this coping strategy appears to be maladaptive. The review of the literature on coping with pain supports this contention, highlighting the consistent nature with which the use of strategies that can be classified as passive in nature is associated with indicators of poor outcome. This relationship was found across study designs and pain populations. However, none of the study designs were confirmatory in nature, and thus the possibility remained that the observed associations between passive coping and poor outcome were confounded by other factors.

Passive coping, as an independent predictor of poor outcome, was assessed in the two confirmatory empirical studies described. In both studies, the Pain Management Inventory was used as a measure of this response style to pain. In individuals from the general population who were suffering from non-disabling neck and/or low back pain, passive coping behaviour was found to be a strong and independent risk factor for the

development of disabling pain, after adjusting for other potentially confounding predictors. Individuals using medium to high levels of passive coping behaviour were at five times greater risk for becoming disabled by their pain compared to those who reported low levels of passive coping.

For individuals suffering from whiplash or low back pain as a result of a motor vehicle collision, the role of passive coping in recovery is less striking. There was a very strong crude (univariate) association between passive coping and time to claim closure, with those using high levels of passive coping taking approximately twice as long to recover (close their claims) as those who used low levels of passive coping. Some of this association could be explained by the confounding effect of pain, disability and other factors. However, even after controlling for a large number of confounders and factors associated with non-response, passive copers took 10% longer to recover. Given the very conservative analysis, it is still suggestive that in this population, passive coping behaviour plays a weak independent role in predicting recovery.

This group of studies provides evidence for the classification of passive coping strategies as maladaptive. While these findings do not necessarily imply that a change to using fewer passive coping strategies will lead to improved outcome, it shows that passive coping predicts poor outcome. The relationship between decreased passive coping leading to improved outcome becomes a plausible hypothesis. Intervention studies are needed to confirm this hypothesis, but one can speculate that this category of coping strategies should be discouraged in pain sufferers and actively targeted by health care professionals working with pain sufferers. Future research can clarify the role of educating individuals on the maladaptive nature of passive coping strategies and the

usefulness of teaching pain sufferers to be able to identify and respond to these types of strategies.

## 6.2 Active Coping

Active coping behaviour includes strategies that involve taking control of pain management or continuing with activities despite the pain (Brown & Nicassio, 1987). This approach to dealing with pain has been thought of as adaptive and is highly promoted in rehabilitation programs for pain sufferers. However, unlike with passive coping, the research findings regarding active coping have been highly inconsistent. The review of the literature on active coping found inconsistent results. Many studies did not report associations between active coping strategies and the other factors under study. The few cohort studies that reported associations found active strategies to be associated with some positive measures of outcome and some negative measures of outcome. Results and outcome measures varied across pain populations. The remaining studies were cross-sectional in design and also reported mixed relationships.

In the two empirical studies of this project, active coping did not play an important role. Active coping, as measured by the Pain Management Inventory, was not an important risk factor for the development of disabling pain for pain sufferers in the general population. It also was not identified as an important prognostic factor for recovery of individuals dealing with pain resulting from motor vehicle collisions. Active coping also had no significant impact on the relationship between passive coping and outcome in these two pain populations.

The inconsistency of active coping may be due to the difference in relationships across pain populations. Another explanation may be the diverse nature of strategies encompassed in many of the scales for active coping. An examination of the

inconsistency in the cross-sectional studies suggests that strategies that involve ignoring the pain or distraction are associated with negative outcome while strategies that involve increasing activity or thinking positive statements are associated with positive outcome. The combination of these strategies in a single measure may be the reason why no relationship or inconsistent results are found. Further research is required to examine the measures of active coping strategies and the role of more cohesive, homogeneous strategies in affecting adjustment.

### 6.3 Coping in Two Pain Populations

The role of passive coping behaviour in predicting subsequent outcome was examined in two pain populations: a general population of neck and/or low back pain sufferers and individuals involved in motor vehicle collisions who subsequently developed whiplash and/or low back pain. Passive coping was found to be a very important risk factor for the development of disabling pain in the general population. However, in the pain sufferers who had been involved in a motor vehicle collision, passive coping played a smaller role in predicting recovery. A discussion of the difference in the importance of passive coping in predicting adjustment is warranted.

First, and perhaps most obviously, the two studies addressed different forms of outcome. In the general population, the outcome of interest was the development of disabling pain. In the other group of pain sufferers, the outcome of interest was closure of insurance claims. Therefore, passive coping appears to play an important role in the development of disability or in predicting poor outcome but a less significant role in the recovery from pain or in predicting positive outcome. The nature of the outcome variable may have also had an impact. The measure of disabling pain was a direct measure of the participants' condition. Claim closure rate, on the other hand, is an

indirect measure found to be reflective of indicators of adjustment. While direct measures of adjustment were available in this study, the high attrition rates and missing data points subjected these variables to considerable bias and called their validity into question. Therefore, a measure available on all participants was chosen despite the fact that it was an indirect measure of recovery. Nevertheless, passive coping may have been associated with more direct measures of functioning in the motor vehicle cohort. Further study of these relationships is required.

Second, despite the similarities between the two pain populations, there are various differences between them and their situations that may account for the differential role of passive coping behaviour. Holahan et al. (1996) suggested that, in addition to the personal and environmental factors, factors related to the stressor itself could impact on the coping behaviour exhibited and subsequent outcome. There are distinct differences between the two pain populations studied that should be noted. First, the nature of the pain experience is different. For the sample from the general population, the pain is chronic in nature and there is not necessarily a specific cause identified for the pain. For the motor vehicle injuries cohort, the pain is more acute and there is a distinct incident that they can attribute the pain to. In addition, this latter cohort must deal with other external factors (e.g., insurance systems, lawyers, reactions to being involved in a collision) that may play a more salient role in their recovery than coping behaviour. These differences in situation may account for the differential impact of passive coping behaviour on outcome. No other studies have addressed the role of coping behaviour in these pain populations. Further study of these pain populations is required to further elucidate our understanding of these relationships.

## 6.4 Theoretical Considerations

One of the key components of the theoretical approach that views coping as a process is its distinction between coping behaviour and outcome. It views coping as specific behaviours without specific assumptions about the success or failure of those coping efforts. However, it does view coping as having an impact on subsequent outcome. This view differs from the psychodynamic view, which looks at the term coping as analogous to positive outcome. It also differs from the stable, personality view of coping, which sees people using the same coping behaviour consistently with little regard for outcome.

The current research findings provide evidence for the process view of coping and against the psychodynamic conceptualization of coping. However, it did not directly address the view of coping as a stable personality trait. All of the studies described above that examined coping behaviour provide support for the process view of coping. In other words, coping was found to be distinct from measures of outcome. In the coping literature, coping behaviour had distinct and varying relationships with measures of outcome and adjustment. In the two empirical studies, coping had varying relationships with two measures of outcome. These findings provide evidence that coping is distinct from outcome and that it has an impact on a person's health and well being.

## 6.5 Conclusions

Everyone experiences physical pain at some point in his or her life. For some people it is an acute and transient experience that does not require a lot of coping effort. However, for many others, it can be a chronic problem that pervades their life. For these individuals, their responses to the pain can have a very significant impact on their



subsequent adjustment. The current literature on coping with pain highlights the maladaptive nature of passive coping strategies like catastrophizing or allowing the pain to restrict/decrease activities. The two studies described above further highlights the negative impact of passive coping behaviour, identifying it as an important risk factor for the development of disabling pain and as a prognostic factor for poor recovery from whiplash and low back pain resulting from a motor vehicle collision. These combined findings point to the need for disseminating information about the maladaptive nature of passive coping strategies and for developing programs that target the decreased use of this response to pain. In addition, it highlights the increased need for research that examines the impact of decreasing these passive strategies and identifying coping behaviours and other factors that promote better adjustment.

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## APPENDIX A

Please fill in the Article Number, Article Title and Reviewer Number before starting the review.

Article Number:  Reviewer:

Article Title:

**Section B: General methodological issues**

For each criterion, check the appropriate box, according to how you think it is addressed.

**1. Research Question Clearly Stated**

☐ Yes ☐ Substandard ☐ No ☐ Not Clear ☐ Not Reported ☐ Not Applicable ☐ Not Qualified

Comments:

**2. Source Population Identified**

☐ Yes ☐ Substandard ☐ No ☐ Not Clear ☐ Not Reported ☐ Not Applicable ☐ Not Qualified

Comments:

**3. Inclusion Criteria Described and Appropriate**

☐ Yes ☐ Substandard ☐ No ☐ Not Clear ☐ Not Reported ☐ Not Applicable ☐ Not Qualified

Comments:

**4. Exclusion Criteria Described and Appropriate**

☐ Yes ☐ Substandard ☐ No ☐ Not Clear ☐ Not Reported ☐ Not Applicable ☐ Not Qualified

Comments:

**5. Number of Excluded or Refusals (before study) reported**

☐ Yes ☐ Substandard ☐ No ☐ Not Clear ☐ Not Reported ☐ Not Applicable ☐ Not Qualified

Comments:

**6. Withdrawals (during study) reported, explained and reasonable**

☐ Yes ☐ Substandard ☐ No ☐ Not Clear ☐ Not Reported ☐ Not Applicable ☐ Not Qualified

Comments:

7. Withdrawals equal in groups

☐ Yes ☐ Substandard ☐ No ☐ Not Clear ☐ Not Reported ☐ Not Applicable ☐ Not Qualified

Comments:

8. Sample size pre-planned to provide adequate statistical power

☐ Yes ☐ Substandard ☐ No ☐ Not Clear ☐ Not Reported ☐ Not Applicable ☐ Not Qualified

Comments:

9. Statistical analyses appropriate

☐ Yes ☐ Substandard ☐ No ☐ Not Clear ☐ Not Reported ☐ Not Applicable ☐ Not Qualified

Comments:

10. Adjustment for important variables measured at entry into study

☐ Yes ☐ Substandard ☐ No ☐ Not Clear ☐ Not Reported ☐ Not Applicable ☐ Not Qualified

Comments:

11. Results verifiable from raw data

☐ Yes ☐ Substandard ☐ No ☐ Not Clear ☐ Not Reported ☐ Not Applicable ☐ Not Qualified

Comments:

**Section C: Check type of study**

Type of Study

- ☐ Assessment of diagnostic procedure/assessment tool
- ☐ Controlled trial of intervention
- ☐ Cohort study
- ☐ Case-control study
- ☐ Cross-sectional study
- ☐ Review/Systematic Review/Meta-analysis
- ☐ Economic Analysis
- ☐ Clinical or descriptive study
- ☐ Other (Guidelines, traditional narratives, etc)

Next Form

## Diagnostic Test/Assessment Tool

### **Section D:** Brief summary of paper: descriptive information (short sentences)

**Diagnostic test/ Assessment tool being assessed:**

--

**Gold standard or criteria for comparison:**

--

**Disease being diagnosed:**

--

**Main source of subjects:**

--

**Inclusion Criteria:**

--

**Exclusion Criteria:**

--

**Main source of data:**

--

**Time between diagnosis and test being assessed:**

--

**Number considered for enrolment:**

--

**Number enrolled:**

--

**Number included in the analysis:**

--

**Statistical methods:**

**Other relevant information:**

**Next Form**

# Diagnostic Test/Assessment Tool

## Section E: Specific methodological issues

### 1. Independent comparison with a gold standard or best available test

☐ Yes ☐ Substandard ☐ No ☐ Not Clear ☐ Not Reported ☐ Not Applicable ☐ Not Qualified

Comments:

### 2. Study setting and selection filters described and adequate

☐ Yes ☐ Substandard ☐ No ☐ Not Clear ☐ Not Reported ☐ Not Applicable ☐ Not Qualified

Comments:

### 3. Appropriate spectrum of cases (normal to severely diseased)

☐ Yes ☐ Substandard ☐ No ☐ Not Clear ☐ Not Reported ☐ Not Applicable ☐ Not Qualified

Comments:

### 4. Appropriate spectrum of controls (disorders not confused with cases)

☐ Yes ☐ Substandard ☐ No ☐ Not Clear ☐ Not Reported ☐ Not Applicable ☐ Not Qualified

Comments:

### 5. Diagnostic criteria of gold standard, or best available test adequately described

☐ Yes ☐ Substandard ☐ No ☐ Not Clear ☐ Not Reported ☐ Not Applicable ☐ Not Qualified

Comments:

### 6. Interpretation of diagnostic test blinded to results of gold standard

☐ Yes ☐ Substandard ☐ No ☐ Not Clear ☐ Not Reported ☐ Not Applicable ☐ Not Qualified

Comments:

### 7. Interpretation of gold standard blinded to results of diagnostic test

☐ Yes ☐ Substandard ☐ No ☐ Not Clear ☐ Not Reported ☐ Not Applicable ☐ Not Qualified

Comments:

### 8. Reliability, internal consistency reported and appropriately analyzed

☐ Yes ☐ Substandard ☐ No ☐ Not Clear ☐ Not Reported ☐ Not Applicable ☐ Not Qualified

Comments:

9. Validity reported (content, construct, criterion)

☐ Yes ☐ Substandard ☐ No ☐ Not Clear ☐ Not Reported ☐ Not Applicable ☐ Not Qualified

Comments:

10. Tactics for carrying out test reported:

☐ Yes ☐ Substandard ☐ No ☐ Not Clear ☐ Not Reported ☐ Not Applicable ☐ Not Qualified

Comments:

11. Sensitivity and specificity values reported

☐ Yes ☐ Substandard ☐ No ☐ Not Clear ☐ Not Reported ☐ Not Applicable ☐ Not Qualified

Comments:

12. Positive and negative predictive values reported

☐ Yes ☐ Substandard ☐ No ☐ Not Clear ☐ Not Reported ☐ Not Applicable ☐ Not Qualified

Comments:

13. Likelihood ratios reported

☐ Yes ☐ Substandard ☐ No ☐ Not Clear ☐ Not Reported ☐ Not Applicable ☐ Not Qualified

Comments:

14. ROC curve(s) reported

☐ Yes ☐ Substandard ☐ No ☐ Not Clear ☐ Not Reported ☐ Not Applicable ☐ Not Qualified

Comments:

15. Responsiveness

☐ Yes ☐ Substandard ☐ No ☐ Not Clear ☐ Not Reported ☐ Not Applicable ☐ Not Qualified

Comments:

Author's key results and conclusions (include quantitative estimates e.g. sensitivity, specificity, predictive values, likelihood ratios, confidence intervals, p values)

Next Form

# Controlled Trial of Interventions

## **Section F:** Brief summary of paper: descriptive information (short sentences)

**Interventions being compared:**

- ☐ 2 Intervention arm
- ☐ > 2 arms

**Design:**

- ☐ Efficacy Trial
- ☐ Effectiveness Trial
- ☐ Parallel
- ☐ Cross-over
- ☐ N of 1

**Method of assignment to intervention group**

**Outcomes ascertained**

**Main source of subjects:**

**Inclusion Criteria:**

**Exclusion Criteria:**

**Main source of data:**

**Duration of Follow-up:**

**Number considered for enrolment:**



**Number enrolled:**

**Number included in the analysis:**

**Statistical methods:**

**Other relevant information:**

**Next Form**

## Controlled Trial of Interventions

### Section G: Specific methodological issues

1. Randomization properly done	<input type="radio"/> Yes <input type="radio"/> Substandard <input type="radio"/> No <input type="radio"/> Not Clear <input type="radio"/> Not Reported <input type="radio"/> Not Applicable <input type="radio"/> Not Qualified
Comments:	
2. Random allocation properly concealed	<input type="radio"/> Yes <input type="radio"/> Substandard <input type="radio"/> No <input type="radio"/> Not Clear <input type="radio"/> Not Reported <input type="radio"/> Not Applicable <input type="radio"/> Not Qualified
Comments:	
3. Baseline comparability reported (including confounding variables)	<input type="radio"/> Yes <input type="radio"/> Substandard <input type="radio"/> No <input type="radio"/> Not Clear <input type="radio"/> Not Reported <input type="radio"/> Not Applicable <input type="radio"/> Not Qualified
Comments:	
4. Same data collection for all arms	<input type="radio"/> Yes <input type="radio"/> Substandard <input type="radio"/> No <input type="radio"/> Not Clear <input type="radio"/> Not Reported <input type="radio"/> Not Applicable <input type="radio"/> Not Qualified
Comments:	
5. Subjects blinded to intervention assignment	<input type="radio"/> Yes <input type="radio"/> Substandard <input type="radio"/> No <input type="radio"/> Not Clear <input type="radio"/> Not Reported <input type="radio"/> Not Applicable <input type="radio"/> Not Qualified
Comments:	
6. Care givers blinded to intervention assignment	<input type="radio"/> Yes <input type="radio"/> Substandard <input type="radio"/> No <input type="radio"/> Not Clear <input type="radio"/> Not Reported <input type="radio"/> Not Applicable <input type="radio"/> Not Qualified
Comments:	
7. Interventions clearly described	<input type="radio"/> Yes <input type="radio"/> Substandard <input type="radio"/> No <input type="radio"/> Not Clear <input type="radio"/> Not Reported <input type="radio"/> Not Applicable <input type="radio"/> Not Qualified
Comments:	
8. Co-interventions monitored	<input type="radio"/> Yes <input type="radio"/> Substandard <input type="radio"/> No <input type="radio"/> Not Clear <input type="radio"/> Not Reported <input type="radio"/> Not Applicable <input type="radio"/> Not Qualified

Comments:

**9. Compliance monitored and equal in all groups**

☐ Yes ☐ Substandard ☐ No ☐ Not Clear ☐ Not Reported ☐ Not Applicable ☐ Not Qualified

Comments:

**10. Side effects assessed**

☐ Yes ☐ Substandard ☐ No ☐ Not Clear ☐ Not Reported ☐ Not Applicable ☐ Not Qualified

Comments:

**11. Outcome(s) defined and measurable**

☐ Yes ☐ Substandard ☐ No ☐ Not Clear ☐ Not Reported ☐ Not Applicable ☐ Not Qualified

Comments:

**12. Outcome(s) valid**

☐ Yes ☐ Substandard ☐ No ☐ Not Clear ☐ Not Reported ☐ Not Applicable ☐ Not Qualified

Comments:

**13. Blind assessment of outcome**

☐ Yes ☐ Substandard ☐ No ☐ Not Clear ☐ Not Reported ☐ Not Applicable ☐ Not Qualified

Comments:

**14. A priori sample size calculation**

☐ Yes ☐ Substandard ☐ No ☐ Not Clear ☐ Not Reported ☐ Not Applicable ☐ Not Qualified

Comments:

**15. Intention-to-treat analyses**

☐ Yes ☐ Substandard ☐ No ☐ Not Clear ☐ Not Reported ☐ Not Applicable ☐ Not Qualified

Comments:

**16. Post hoc power analyses**

☐ Yes ☐ Substandard ☐ No ☐ Not Clear ☐ Not Reported ☐ Not Applicable ☐ Not Qualified

Comments:

**Author's key results and conclusions (include quantitative estimates e.g. relative risks, reduction in risk, effect sizes, confidence intervals, p values)**

--

**Next Form**

## Cohort Study

### **Section H:** Brief summary of paper: descriptive information (short sentences)

#### **Exposure/Explanatory factors**

#### **Design**

☐ Risk

☐ Prognostic

☐ Intervention

☐ Prospective

☐ Retrospective

☐ Mixed

☐ Single Cohort

☐ 2 or more Cohort

#### **Outcomes ascertained**

#### **Main source of subjects:**

#### **Inclusion Criteria:**

#### **Exclusion Criteria:**

#### **Main source of data:**

#### **Duration of Follow-up:**

#### **Number considered for enrolment:**

**Number enrolled:**

**Number included in the analysis:**

**Statistical methods:**

**Other relevant information:**

**Next Form**

## Cohort Study

### Section I: Specific methodological issues

#### 1. Zero time identified

☐ Yes ☐ Substandard ☐ No ☐ Not Clear ☐ Not Reported ☐ Not Applicable ☐ Not Qualified

Comments:

#### 2. Baseline comparability reported (including confounding variables)

☐ Yes ☐ Substandard ☐ No ☐ Not Clear ☐ Not Reported ☐ Not Applicable ☐ Not Qualified

Comments:

#### 3. Same data collection for all cohorts

☐ Yes ☐ Substandard ☐ No ☐ Not Clear ☐ Not Reported ☐ Not Applicable ☐ Not Qualified

Comments:

#### 4. Important baseline variables measured, valid, and reliable

☐ Yes ☐ Substandard ☐ No ☐ Not Clear ☐ Not Reported ☐ Not Applicable ☐ Not Qualified

Comments:

#### 5. All aspects of exposure measured (dose, level, duration)

☐ Yes ☐ Substandard ☐ No ☐ Not Clear ☐ Not Reported ☐ Not Applicable ☐ Not Qualified

Comments:

#### 6. Exposure adequately measured (previous, at entry, during study)

☐ Yes ☐ Substandard ☐ No ☐ Not Clear ☐ Not Reported ☐ Not Applicable ☐ Not Qualified

Comments:

#### 7. Regular follow-up periods

☐ Yes ☐ Substandard ☐ No ☐ Not Clear ☐ Not Reported ☐ Not Applicable ☐ Not Qualified

Comments:

#### 8. Co-exposures monitored

☐ Yes ☐ Substandard ☐ No ☐ Not Clear ☐ Not Reported ☐ Not Applicable ☐ Not Qualified

Comments:

9. Duration of follow-up adequate

☐ Yes ☐ Substandard ☐ No ☐ Not Clear ☐ Not Reported ☐ Not Applicable ☐ Not Qualified

Comments:

10. Outcome(s) defined and measurable

☐ Yes ☐ Substandard ☐ No ☐ Not Clear ☐ Not Reported ☐ Not Applicable ☐ Not Qualified

Comments:

11. Outcome(s) valid

☐ Yes ☐ Substandard ☐ No ☐ Not Clear ☐ Not Reported ☐ Not Applicable ☐ Not Qualified

Comments:

12. Blind assessment of outcome(s)

☐ Yes ☐ Substandard ☐ No ☐ Not Clear ☐ Not Reported ☐ Not Applicable ☐ Not Qualified

Comments:

13. Analyses controls for confounding variables

☐ Yes ☐ Substandard ☐ No ☐ Not Clear ☐ Not Reported ☐ Not Applicable ☐ Not Qualified

Comments:

Author's key results and conclusions (include quantitative estimates e.g. relative risks, reduction in risk, confidence intervals, p values)

Next Form



## Case-control Study

### **Section J:** Brief summary of paper: descriptive information (short sentences)

#### **Exposure/Explanatory factors**

#### **Design**

- ☐ Matched
- ☐ Unmatched

- ☐ Single control group
- ☐ 2 or more control groups

#### **Disease under Study:**

#### **Main source of subjects:**

##### **Case:**

- ☐ Community
- ☐ Hospital
- ☐ Population-based
- ☐ Other

##### **Controls:**

- ☐ Community
- ☐ Hospital
- ☐ Population-based
- ☐ Other

#### **Inclusion Criteria::**

##### **Case:**

##### **Case:**

- ☐ Incident
- ☐ Prevalent
- ☐ Not Applicable

**Controls:**

**Exclusion Criteria:**

**Case:**

**Controls:**

**Main source of data:**

- ☐ Interviewer
- ☐ Self-questionnaire
- ☐ Patient Records

**Time between diagnosis and test being assessed:**

**Number considered for enrolment:**

**Number enrolled:**

**Number included in the analyses**

**Statistical methods:**

**Other relevant information:**

**Next Form**

## Case-control Study

### Section K: Specific methodological issues

1. Similar population sources for cases and controls (time, place, potential for exposure)		_____				
<input type="radio"/> Yes	<input type="radio"/> Substandard	<input type="radio"/> No	<input type="radio"/> Not Clear	<input type="radio"/> Not Reported	<input type="radio"/> Not Applicable	<input type="radio"/> Not Qualified
Comments:		_____				
2. Referral and sampling independent of exposure		_____				
<input type="radio"/> Yes	<input type="radio"/> Substandard	<input type="radio"/> No	<input type="radio"/> Not Clear	<input type="radio"/> Not Reported	<input type="radio"/> Not Applicable	<input type="radio"/> Not Qualified
Comments:		_____				
3. Random selection of controls		_____				
<input type="radio"/> Yes	<input type="radio"/> Substandard	<input type="radio"/> No	<input type="radio"/> Not Clear	<input type="radio"/> Not Reported	<input type="radio"/> Not Applicable	<input type="radio"/> Not Qualified
Comments:		_____				
4. Diagnostic criteria for cases clear, precise and valid		_____				
<input type="radio"/> Yes	<input type="radio"/> Substandard	<input type="radio"/> No	<input type="radio"/> Not Clear	<input type="radio"/> Not Reported	<input type="radio"/> Not Applicable	<input type="radio"/> Not Qualified
Comments:		_____				
5. Date of diagnosis for cases operationally defined		_____				
<input type="radio"/> Yes	<input type="radio"/> Substandard	<input type="radio"/> No	<input type="radio"/> Not Clear	<input type="radio"/> Not Reported	<input type="radio"/> Not Applicable	<input type="radio"/> Not Qualified
Comments:		_____				
6. Ascertainment of disease adequate for cases and controls		_____				
<input type="radio"/> Yes	<input type="radio"/> Substandard	<input type="radio"/> No	<input type="radio"/> Not Clear	<input type="radio"/> Not Reported	<input type="radio"/> Not Applicable	<input type="radio"/> Not Qualified
Comments:		_____				
7. Comparison of cases and controls at enrolment reported (including confounding variables)		_____				
<input type="radio"/> Yes	<input type="radio"/> Substandard	<input type="radio"/> No	<input type="radio"/> Not Clear	<input type="radio"/> Not Reported	<input type="radio"/> Not Applicable	<input type="radio"/> Not Qualified
Comments:		_____				
8. All aspects of exposure measured (level, dose, duration, etc.)		_____				
<input type="radio"/> Yes	<input type="radio"/> Substandard	<input type="radio"/> No	<input type="radio"/> Not Clear	<input type="radio"/> Not Reported	<input type="radio"/> Not Applicable	<input type="radio"/> Not Qualified
Comments:		_____				

9. Exposure adequately measured (same in all groups, blinded)

☐ Yes ☐ Substandard ☐ No ☐ Not Clear ☐ Not Reported ☐ Not Applicable ☐ Not Qualified

Comments:

10. Co-exposures measured

☐ Yes ☐ Substandard ☐ No ☐ Not Clear ☐ Not Reported ☐ Not Applicable ☐ Not Qualified

Comments:

11. Recall bias controlled

☐ Yes ☐ Substandard ☐ No ☐ Not Clear ☐ Not Reported ☐ Not Applicable ☐ Not Qualified

Comments:

12. Data collection valid and reliable

☐ Yes ☐ Substandard ☐ No ☐ Not Clear ☐ Not Reported ☐ Not Applicable ☐ Not Qualified

Comments:

13. Analysis according to level of exposure

☐ Yes ☐ Substandard ☐ No ☐ Not Clear ☐ Not Reported ☐ Not Applicable ☐ Not Qualified

Comments:

14. Effect of matching assessed

☐ Yes ☐ Substandard ☐ No ☐ Not Clear ☐ Not Reported ☐ Not Applicable ☐ Not Qualified

Comments:

Author's key results and conclusions (include quantitative estimates e.g. odds ratios, relative risks, reduction in risk, effect sizes, confidence intervals, p values)

Next Form

## Cross-sectional Study

---

### **Section L:** Brief summary of paper: descriptive information (short sentences)

Exposure factors:

Outcomes ascertained

Main source of subjects:

Inclusion Criteria:

Exclusion Criteria:

Main source of data:

Follow-up subsequent to cross-sectional study: ☐

☐ Yes

☐ No

Number considered for enrolment:

Number enrolled:

Number included in the Analysis:

Statistical methods:

Other relevant information:

Next Form

## Cross-sectional Study

### Section M: Specific methodological issues

#### 1. Similar sampling procedures for all subjects

☐ Yes   ☐ Substandard   ☐ No   ☐ Not Clear   ☐ Not Reported   ☐ Not Applicable   ☐ Not Qualified

Comments:

#### 2. Similar ascertainment of exposure for all subjects

☐ Yes   ☐ Substandard   ☐ No   ☐ Not Clear   ☐ Not Reported   ☐ Not Applicable   ☐ Not Qualified

Comments:

#### 3. Similar referral and diagnostic procedures for all subjects

☐ Yes   ☐ Substandard   ☐ No   ☐ Not Clear   ☐ Not Reported   ☐ Not Applicable   ☐ Not Qualified

Comments:

#### 4. Diagnostic criteria for disease (clear, reliable and valid)

☐ Yes   ☐ Substandard   ☐ No   ☐ Not Clear   ☐ Not Reported   ☐ Not Applicable   ☐ Not Qualified

Comments:

#### 5. Characteristics of subjects at enrolment reported

☐ Yes   ☐ Substandard   ☐ No   ☐ Not Clear   ☐ Not Reported   ☐ Not Applicable   ☐ Not Qualified

Comments:

#### 6. All aspects of exposure measured (level, dose, duration, etc)

☐ Yes   ☐ Substandard   ☐ No   ☐ Not Clear   ☐ Not Reported   ☐ Not Applicable   ☐ Not Qualified

Comments:

#### 7. Co-exposures measured

☐ Yes   ☐ Substandard   ☐ No   ☐ Not Clear   ☐ Not Reported   ☐ Not Applicable   ☐ Not Qualified

Comments:

#### 8. Recall bias controlled

☐ Yes   ☐ Substandard   ☐ No   ☐ Not Clear   ☐ Not Reported   ☐ Not Applicable   ☐ Not Qualified

Comments:

9. Data collection valid and reliable \_\_\_\_\_  
☐ Yes    ☐ Substandard    ☐ No    ☐ Not Clear    ☐ Not Reported    ☐ Not Applicable    ☐ Not Qualified

Comments:

10. Effect of duration of disease discussed (e.g. selective survival) \_\_\_\_\_  
☐ Yes    ☐ Substandard    ☐ No    ☐ Not Clear    ☐ Not Reported    ☐ Not Applicable    ☐ Not Qualified

Comments:

11. Analyses controls for confounding factor \_\_\_\_\_  
☐ Yes    ☐ Substandard    ☐ No    ☐ Not Clear    ☐ Not Reported    ☐ Not Applicable    ☐ Not Qualified

Comments:

Author's key results and conclusions (include quantitative estimates e.g. odds ratios, relative risks, reduction in risk, effect sizes, confidence intervals, p values)

Next Form



## Review/Systematic Review/Meta-analysis

---

**Section N:** Brief summary of paper: descriptive information (short sentences)

Intent of the review/question being asked:

Search strategy used:

Outcomes ascertained:

Main source of subjects (in primary studies):

Inclusion Criteria:

Exclusion Criteria:

Types of primary studies combined:

Total number of patients in the review:

Methods used to assess quality of the study:

Statistical methods:

Methods used to assess heterogeneity:

Qualitative or quantitative summary of information:

**Systematic Review:**

- ☐ Yes  
☐ No

**Meta-analysis applied:**

- ☐ Yes  
☐ No

**Narrative Review:**

- ☐ Yes  
☐ No

**Other relevant information:**

**Next Form**

## Review/Systematic Review/Meta-analysis

### Section O: Specific methodological issues

1. The question is clearly focused \_\_\_\_\_  
☐ Yes   ☐ Substandard   ☐ No   ☐ Not Clear   ☐ Not Reported   ☐ Not Applicable   ☐ Not Qualified

Comments: \_\_\_\_\_

2. The search methods reported \_\_\_\_\_  
☐ Yes   ☐ Substandard   ☐ No   ☐ Not Clear   ☐ Not Reported   ☐ Not Applicable   ☐ Not Qualified

Comments: \_\_\_\_\_

3. The search is comprehensive \_\_\_\_\_  
☐ Yes   ☐ Substandard   ☐ No   ☐ Not Clear   ☐ Not Reported   ☐ Not Applicable   ☐ Not Qualified

Comments: \_\_\_\_\_

4. Inclusion criteria reported \_\_\_\_\_  
☐ Yes   ☐ Substandard   ☐ No   ☐ Not Clear   ☐ Not Reported   ☐ Not Applicable   ☐ Not Qualified

Comments: \_\_\_\_\_

5. Inclusion criteria appropriate \_\_\_\_\_  
☐ Yes   ☐ Substandard   ☐ No   ☐ Not Clear   ☐ Not Reported   ☐ Not Applicable   ☐ Not Qualified

Comments: \_\_\_\_\_

6. Primary studies quality assessed \_\_\_\_\_  
☐ Yes   ☐ Substandard   ☐ No   ☐ Not Clear   ☐ Not Reported   ☐ Not Applicable   ☐ Not Qualified

Comments: \_\_\_\_\_

7. Reporting of method to combine primary studies \_\_\_\_\_  
☐ Yes   ☐ Substandard   ☐ No   ☐ Not Clear   ☐ Not Reported   ☐ Not Applicable   ☐ Not Qualified

Comments: \_\_\_\_\_

8. Heterogeneity assessed \_\_\_\_\_  
☐ Yes   ☐ Substandard   ☐ No   ☐ Not Clear   ☐ Not Reported   ☐ Not Applicable   ☐ Not Qualified

Comments: \_\_\_\_\_

9. Conclusions based on evidence ☐ Yes ☐ Substandard ☐ No ☐ Not Clear ☐ Not Reported ☐ Not Applicable ☐ Not Qualified

Comments:

10. Bias of authors clearly state ☐ Yes ☐ Substandard ☐ No ☐ Not Clear ☐ Not Reported ☐ Not Applicable ☐ Not Qualified

Comments:

Author's key results and conclusions (include quantitative estimates e.g. odds ratios, relative risks, reduction in risk, effect sizes, confidence intervals, p values)

Next Form

## Economic Analysis

### **Section P:** Brief summary of paper: descriptive information (short sentences)

**What was the perspective taken in the analysis? (e.g. societal, governmental, formulary, individual)**

**Describe the evidence presented that the program(s) is/are effective:**

**Describe the population being studied:**

**Describe the baseline risk in the population:**

**Describe the strategies being costed out:**

**Describe the source of economic data (e.g. country, health system, direct costs, indirect costs):**

**Describe the method used to account for inflation:**

**Describe the methods used in sensitivity analysis:**

**Describe the key determinants of cost effectiveness in this model(s):**

**Do the treatment benefits seem worth the harms and costs:**

**Barriers to having the programs easily or widely implemented:**

**Other relevant information:**

**Next Form**

# Economic Analysis

## Section Q: Specific methodological issues

1. Health outcomes considered:	<input type="radio"/> Yes	<input type="radio"/> Substandard	<input type="radio"/> No	<input type="radio"/> Not Clear	<input type="radio"/> Not Reported	<input type="radio"/> Not Applicable	<input type="radio"/> Not Qualifie
Comments:							
2. Two or more strategies, tests, treatments, programs compared	<input type="radio"/> Yes	<input type="radio"/> Substandard	<input type="radio"/> No	<input type="radio"/> Not Clear	<input type="radio"/> Not Reported	<input type="radio"/> Not Applicable	<input type="radio"/> Not Qualifie
Comments:							
3. All relevant clinical strategies compared:	<input type="radio"/> Yes	<input type="radio"/> Substandard	<input type="radio"/> No	<input type="radio"/> Not Clear	<input type="radio"/> Not Reported	<input type="radio"/> Not Applicable	<input type="radio"/> Not Qualifie
Comments:							
4. Costing methods clearly presented:	<input type="radio"/> Yes	<input type="radio"/> Substandard	<input type="radio"/> No	<input type="radio"/> Not Clear	<input type="radio"/> Not Reported	<input type="radio"/> Not Applicable	<input type="radio"/> Not Qualifie
Comments:							
5. Future costs properly evaluated:	<input type="radio"/> Yes	<input type="radio"/> Substandard	<input type="radio"/> No	<input type="radio"/> Not Clear	<input type="radio"/> Not Reported	<input type="radio"/> Not Applicable	<input type="radio"/> Not Qualifie
Comments:							
6. Sensitivity analyses performed:	<input type="radio"/> Yes	<input type="radio"/> Substandard	<input type="radio"/> No	<input type="radio"/> Not Clear	<input type="radio"/> Not Reported	<input type="radio"/> Not Applicable	<input type="radio"/> Not Qualifie
Comments:							
7. Baseline population risk presented	<input type="radio"/> Yes	<input type="radio"/> Substandard	<input type="radio"/> No	<input type="radio"/> Not Clear	<input type="radio"/> Not Reported	<input type="radio"/> Not Applicable	<input type="radio"/> Not Qualifie
Comments:							
8. Analyses adjusted for differences in baseline risk	<input type="radio"/> Yes	<input type="radio"/> Substandard	<input type="radio"/> No	<input type="radio"/> Not Clear	<input type="radio"/> Not Reported	<input type="radio"/> Not Applicable	<input type="radio"/> Not Qualifie

Comments:

9. Conclusions consistent with the data

☐ Yes   ☐ Substandard   ☐ No   ☐ Not Clear   ☐ Not Reported   ☐ Not Applicable   ☐ Not Qualified

Comments:

10. Incremental costs expressed per unit of benefit

☐ Yes   ☐ Substandard   ☐ No   ☐ Not Clear   ☐ Not Reported   ☐ Not Applicable   ☐ Not Qualified

Comments:

**Author's key results and conclusions (include quantitative estimates e.g. odds ratios, relative risks, reduction in risk, effect sizes, confidence intervals, p values)**

Next Form



## Conclusions and Assessment of the Article

### Section R:

#### I. Strengths of the paper:

--

#### II. Weaknesses of the paper:

--

#### III. Reviewer's conclusions different from the author's:

☐ Yes

☐ No

If different, please state the reviewer's conclusions:

--

#### Clinical Relevance:

☐ Relevant

☐ Questionable relevance

☐ Irrelevant

☐ Not qualified to evaluate

#### Scientific Merit:

☐ Scientifically Admissable (accepted)

☐ Scientifically Inadmissable (rejected)

#### VI. Study relates to:

☐ Diagnosis

☐ Prognosis

☐ Primary Prevention/Risk

☐ Intervention

☐ Economic costs

#### VII. Recommendations concerning possible additional specialized reviewer:

--

#### VIII. Are there references cited in this article that should be added to the list of papers to be criticized?

☐ Yes  
☐ No

If Yes, which:

Print Report

Save/Close

## Appendix B

### Coping Review Reference List

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*Italicized references are accepted studies*

## APPENDIX D



**Welcome to...**

## **The Saskatchewan Health and Back Pain Survey**

---

Your participation is important because:

1. It is likely that you or somebody you know suffers from a painful neck or back.
2. To develop helpful and cost-effective treatments for neck and low back pain we need to understand how it affects peoples' lives.
3. Prevention is the best cure. Please help us to find the causes of neck and low back pain by filling out this questionnaire.

**Section A**  
Your General Health

**Section B**  
Neck and Low Back Pain

**Section C**  
How You Manage Your Pain

**Section D**  
Questions About Your Mood

**Section E**  
About You

---

### **Return Date**

Please return the completed questionnaire in the enclosed pre-paid envelope  
**as soon as possible.**

---

### **Help and Advice**

If you have any questions about this survey or need help completing the questionnaire,  
please call 966-8465 in Saskatoon or 1-800-667-8505 toll-free outside of Saskatoon.

**Section A. Your General Health**

In this section, we are interested in your general health. Please answer these questions to the best of your knowledge.

1. Please check the circle "☑" if you currently have any of the following health problems. If you do, to what extent have these problems affected your health in the last six months.

**Not at all:** the problem does not affect my health.

**Mild:** the problem makes my health a little worse than it should be.

**Moderate:** the problem makes my health worse than it should be.

**Severe:** the problem makes my health much worse than it should be.

Health Problem	Have it?	Affects your health?
a. Rheumatoid arthritis; Osteoarthritis of the knee, hip or hand; Osteoporosis or thin bones; Fracture	Yes <input type="radio"/> → No <input type="radio"/> ↓	Not at all . . <input type="radio"/> Mild . . . . . <input type="radio"/> Moderate . . <input type="radio"/> Severe . . . . <input type="radio"/>
b. Allergies (such as hay fever, dermatitis, eczema, allergies to medication, food allergy, others)	Yes <input type="radio"/> → No <input type="radio"/> ↓	Not at all . . <input type="radio"/> Mild . . . . . <input type="radio"/> Moderate . . <input type="radio"/> Severe . . . . <input type="radio"/>
c. Breathing problems (such as asthma, emphysema, bronchitis, fibrosis, lung scarring, TB, pneumonia, infection, common cold, others)	Yes <input type="radio"/> → No <input type="radio"/> ↓	Not at all . . <input type="radio"/> Mild . . . . . <input type="radio"/> Moderate . . <input type="radio"/> Severe . . . . <input type="radio"/>
d. High blood pressure (hypertension)	Yes <input type="radio"/> → No <input type="radio"/> ↓	Not at all . . <input type="radio"/> Mild . . . . . <input type="radio"/> Moderate . . <input type="radio"/> Severe . . . . <input type="radio"/>

Health Problem	Have it?	Affects your health?
e. <b>Heart and circulation problems</b> (such as angina, heart attack, heart failure, heart valve problem, hardening of arteries, varicose veins, claudication, foot or leg ulcers, others).	Yes <input type="radio"/> → No <input type="radio"/> ↓	Not at all . . . <input type="radio"/> Mild . . . . . <input type="radio"/> Moderate . . . <input type="radio"/> Severe . . . . . <input type="radio"/>
f. <b>Digestive system problems</b> (such as ulcer, gastritis, inflammatory or irritable bowel disease, colitis, Crohn's disease, hiatus hernia, gall stones, pancreatitis, others)	Yes <input type="radio"/> → No <input type="radio"/> ↓	Not at all . . . <input type="radio"/> Mild . . . . . <input type="radio"/> Moderate . . . <input type="radio"/> Severe . . . . . <input type="radio"/>
g. <b>Diabetes</b>	Yes <input type="radio"/> → No <input type="radio"/> ↓	Not at all . . . <input type="radio"/> Mild . . . . . <input type="radio"/> Moderate . . . <input type="radio"/> Severe . . . . . <input type="radio"/>
h. <b>Kidney, bladder or urinary problems</b> (such as kidney failure, nephritis, kidney stones, urinary tract infection, prostate problems, bladder control problems, others)	Yes <input type="radio"/> → No <input type="radio"/> ↓	Not at all . . . <input type="radio"/> Mild . . . . . <input type="radio"/> Moderate . . . <input type="radio"/> Severe . . . . . <input type="radio"/>
i. <b>Neurological problems</b> (such as stroke, seizures, multiple sclerosis, Parkinson's, paraplegia, quadriplegia, paralysis, Alzheimer's, dizziness, others)	Yes <input type="radio"/> → No <input type="radio"/> ↓	Not at all . . . <input type="radio"/> Mild . . . . . <input type="radio"/> Moderate . . . <input type="radio"/> Severe . . . . . <input type="radio"/>
j. <b>Headaches</b> (such as migraine, tension, stress, sinus, others)	Yes <input type="radio"/> → No <input type="radio"/> ↓	Not at all . . . <input type="radio"/> Mild . . . . . <input type="radio"/> Moderate . . . <input type="radio"/> Severe . . . . . <input type="radio"/>
k. <b>Mental or emotional problems</b> (such as depression, anxiety, substance abuse: alcohol, drugs, others)	Yes <input type="radio"/> → No <input type="radio"/> ↓	Not at all . . . <input type="radio"/> Mild . . . . . <input type="radio"/> Moderate . . . <input type="radio"/> Severe . . . . . <input type="radio"/>

Health Problem	Have it?	Affects your health?
l. <b>Cancer</b> (such as breast, lung, prostate, cervix, stomach, colon, kidney, bone, metastasis or spread, lymphoma, leukemia, others)	Yes <input type="radio"/> → No <input type="radio"/> ↓	Not at all . . <input type="radio"/> Mild . . . . . <input type="radio"/> Moderate . . <input type="radio"/> Severe . . . . <input type="radio"/>
m. <b>Gynecological problems</b> (such as endometriosis, dysmenorrhea or menstrual problems, fibroids, ovarian cysts, others).	Yes <input type="radio"/> → No <input type="radio"/> ↓	Not at all . . <input type="radio"/> Mild . . . . . <input type="radio"/> Moderate . . <input type="radio"/> Severe . . . . <input type="radio"/>
n. <b>Blood problems</b> (such as AIDS or HIV+, anemia, bleeding problems)	Yes <input type="radio"/> → No <input type="radio"/> ↓	Not at all . . <input type="radio"/> Mild . . . . . <input type="radio"/> Moderate . . <input type="radio"/> Severe . . . . <input type="radio"/>
o. <b>Other problems</b>  Please list: _____	Yes <input type="radio"/> → No <input type="radio"/> ↓	Not at all . . <input type="radio"/> Mild . . . . . <input type="radio"/> Moderate . . <input type="radio"/> Severe . . . . <input type="radio"/>

2. Have you ever smoked at least one cigarette a day for at least one year?

No . . ☐ → (skip to page 5)

Yes . . ☐

3. How many years have you smoked at least one cigarette a day? \_\_\_\_\_ years.

4. Do you still smoke cigarettes? No . . ☐ → (skip to page 5)

Yes . . ☐

5. On average, how many cigarettes do you smoke per day? (one pack equals "25" cigarettes)

Less than one pack per day . . . . . ☐

One pack or more than one pack per day . . . . ☐

<b>SF-36 HEALTH SURVEY</b>
----------------------------

**INSTRUCTIONS:** This survey asks for your views about your health. This information will help keep track of how you feel and how well you are able to do your usual activities.

Answer every question by marking the answer as indicated. If you are unsure about how to answer a question, please give the best answer you can.

1. In general, would you say your health is:

(circle one)

- |                 |   |
|-----------------|---|
| Excellent ..... | 1 |
| Very good ..... | 2 |
| Good .....      | 3 |
| Fair .....      | 4 |
| Poor .....      | 5 |

2. Compared to one year ago, how would you rate your health in general now?

(circle one)

- |   |   |
|---|---|
| Much better now than one year ago .....     | 1 |
| Somewhat better now than one year ago ..... | 2 |
| About the same as one year ago .....        | 3 |
| Somewhat worse now than one year ago .....  | 4 |
| Much worse now than one year ago .....      | 5 |

3. The following items are about activities you might do during a typical day. Does your health now limit you in these activities? If so, how much?

(circle one number on each line)

<b><u>ACTIVITIES</u></b>	<b>Yes, Limited A Lot</b>	<b>Yes, Limited A Little</b>	<b>No, Not Limited At All</b>
a. Vigorous activities, such as running, lifting heavy objects, participating in strenuous sports	1	2	3
b. Moderate activities, such as moving a table, pushing a vacuum cleaner, bowling, or playing golf	1	2	3
c. Lifting or carrying groceries	1	2	3
d. Climbing several flights of stairs	1	2	3
e. Climbing one flight of stairs	1	2	3
f. Bending, kneeling, or stooping	1	2	3
g. Walking more than a kilometre	1	2	3
h. Walking several blocks	1	2	3
i. Walking one block	1	2	3
j. Bathing or dressing yourself	1	2	3

4. During the past 4 weeks, have you had any of the following problems with your work or other regular daily activities as a result of your physical health?

(circle one number on each line)

	<b>YES</b>	<b>NO</b>
a. Cut down on the amount of time you spent on work or other activities	1	2
b. Accomplished less than you would like	1	2
c. Were limited in the kind of work or other activities	1	2
d. Had difficulty performing the work or other activities (for example, it took extra effort)	1	2



5. During the past 4 weeks, have you had any of the following problems with your work or other regular daily activities as a result of any emotional problems (such as feeling depressed or anxious)?

(circle one number on each line)

	YES	NO
a. Cut down the amount of time you spent on work or other activities	1	2
b. Accomplished less than you would like	1	2
c. Didn't do work or other activities as carefully as usual	1	2

6. During the past 4 weeks, to what extent has your physical health or emotional problems interfered with your normal social activities with family, friends, neighbours, or groups?

(circle one)

- Not at all ..... 1
- Slightly ..... 2
- Moderately..... 3
- Quite a bit..... 4
- Extremely ..... 5

7. How much bodily pain have you had during the past 4 weeks?

(circle one)

- None..... 1
- Very mild..... 2
- Mild..... 3
- Moderate..... 4
- Severe..... 5
- Very severe..... 6

8. During the past 4 weeks, how much did pain interfere with your normal work (including both work outside the home and housework)?

(circle one)

Not at all ..... 1

A little bit ..... 2

Moderately ..... 3

Quite a bit ..... 4

Extremely ..... 5

9. These questions are about how you feel and how things have been with you during the past 4 weeks. For each question, please give the one answer that comes closest to the way you have been feeling. How much of the time during the past 4 weeks -

(circle one number on each line)

	All of the Time	Most of the Time	A Good Bit of the Time	Some of the Time	A Little of the Time	None of the time
a. Did you feel full of pep?	1	2	3	4	5	6
b. Have you been a very nervous person?	1	2	3	4	5	6
c. Have you felt so down in the dumps that nothing could cheer you up?	1	2	3	4	5	6
d. Have you felt calm and peaceful?	1	2	3	4	5	6
e. Did you have a lot of energy?	1	2	3	4	5	6
f. Have you felt downhearted and blue?	1	2	3	4	5	6
g. Did you feel worn out?	1	2	3	4	5	6
h. Have you been a happy person?	1	2	3	4	5	6
i. Did you feel tired?	1	2	3	4	5	6

10. During the past 4 weeks, how much of the time has your physical health or emotional problems interfered with your social activities (like visiting with friends, relatives, etc)?

(circle one)

- All of the time ..... 1
- Most of the time ..... 2
- Some of the time ..... 3
- A little of the time ..... 4
- None of the time ..... 5

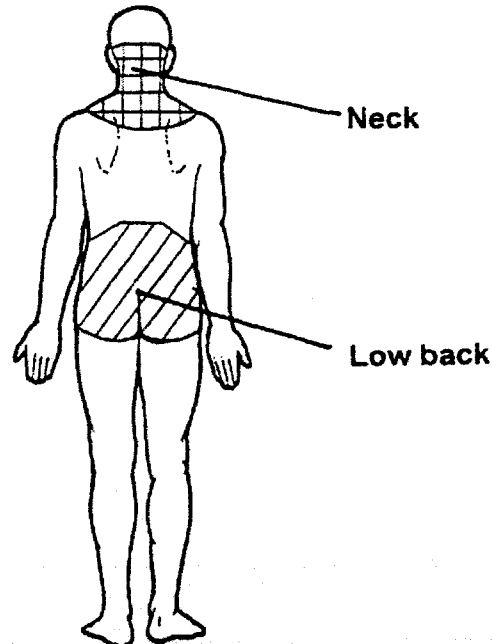
11. How TRUE or FALSE is each of the following statements to you?

(circle one number on each line)

	Definitely True	Mostly True	Don't Know	Mostly False	Definitely False
a. I seem to get sick a little easier than other people	1	2	3	4	5
b. I am as healthy as anybody I know	1	2	3	4	5
c. I expect my health to get worse	1	2	3	4	5
d. My health is excellent	1	2	3	4	5

## **Section B. Neck and Low Back Pain**

In this section, we will ask you about neck and low back problems. What we mean by neck and low back is illustrated on this diagram. When answering questions about neck and low back pain, please refer to the diagram.



1. Have you ever injured your neck or low back in a motor vehicle accident?

a) Neck ..... Yes ☐ No ☐

b) Low back..... Yes ☐ No ☐

2. Have you ever injured your neck or low back at work?

a) Neck..... Yes ☐ No ☐

b) Low back..... Yes ☐ No ☐

If yes, have you ever had to take time off work or perform light duties at work because of a work injury?

a) Neck injury..... Yes ☐ No ☐

b) Low back injury.. Yes ☐ No ☐

**Neck Pain** (please refer to body diagram on page 10)

1. In your lifetime, have you ever had neck pain? No . . . ☐ → (skip to page 13)  
Yes . . . ☐

2. About how many days in the past six months have you had neck pain ?

0 days... ☐    1-30 days... ☐    31-89 days... ☐    90-180 days... ☐

3. Do you have neck pain at the present time, that is right now? No . . . ☐  
Yes . . . ☐

- If you have neck pain right now, does it travel into your arm(s)? No . . . ☐  
Yes . . . ☐

**In the next section, you will be asked to describe your neck pain. Please answer by circling the appropriate number from 0 to 10. Answer all questions by circling only one number.**

1. How would you rate your neck pain on a 0-10 scale at the present time, that is right now, where 0 is "no neck pain" and 10 is "neck pain as bad as could be"?

No pain Pain as bad as could be

0      1      2      3      4      5      6      7      8      9      10

2. In the past 6 months, how intense was your worst neck pain rated on a 0-10 scale where 0 is "no neck pain" and 10 is "neck pain as bad as could be"?

No pain Pain as bad as could be

0      1      2      3      4      5      6      7      8      9      10

3. In the past 6 months, on the average, how intense was your neck pain rated on a 0-10 scale where 0 is "no neck pain" and 10 is "neck pain as bad as could be"?

No pain Pain as bad as could be

0      1      2      3      4      5      6      7      8      9      10

4. About how many days in the last 6 months have you been kept from your usual activities (work, school, or housework) because of neck pain? (please check appropriate circle)

0-6 days	<input type="radio"/>	15-30 days	<input type="radio"/>
7-14 days	<input type="radio"/>	31 or more days	<input type="radio"/>

5. In the past 6 months, how much has your neck pain interfered with your daily activities rated on a 0-10 scale where 0 is "no interference" and 10 is "unable to carry on any activities"?

No interference Unable to carry on any activities

0      1      2      3      4      5      6      7      8      9      10

6. In the past 6 months, how much has your neck pain changed your ability to take part in recreational, social and family activities where 0 is "no change" and 10 is "extreme change"?

No change Extreme change

0      1      2      3      4      5      6      7      8      9      10

7. In the past 6 months, how much has your neck pain changed your ability to work (including housework) where 0 is "no change" and 10 is "extreme change"?

No change Extreme change

0      1      2      3      4      5      6      7      8      9      10

**Low Back Pain** (please refer to body diagram on page 10)

1. In your lifetime, have you ever had low back pain? No ☐ → (skip to page 15)  
Yes ☐

2. About how many days in the past six months have you had low back pain ?

0 days... ☐ 1-30 days... ☐ 31-89 days... ☐ 90-180 days... ☐

3. Do you have low back pain at the present time, that is right now? No ..... ☐  
Yes ..... ☐

- If you have low back pain right now, does it travel into your leg(s)? No ..... ☐  
Yes ..... ☐

Now, we would like to know a bit more about your low back pain. Please answer by circling the appropriate number from 0 to 10. Answer all questions by circling only one number.

1. How would you rate your low back pain on a 0-10 scale at the present time, that is right now, where 0 is "no low back pain" and 10 is "low back pain as bad as could be"?

No pain Pain as bad as could be

0      1      2      3      4      5      6      7      8      9      10

2. In the past 6 months, how intense was your worst low back pain rated on a 0-10 scale where 0 is "no low back pain" and 10 is "low back pain as bad as could be"?

No pain Pain as bad as could be

0      1      2      3      4      5      6      7      8      9      10

3. In the past 6 months, on the average, how intense was your low back pain rated on a 0-10 scale where 0 is "no low back pain" and 10 is "low back pain as bad as could be"?

No pain Pain as bad as could be

0      1      2      3      4      5      6      7      8      9      10

4. About how many days in the last 6 months have you been kept from your usual activities (work, school, or housework) because of low back pain? (please check appropriate circle)

0-6 days	<input type="radio"/>	15-30 days	<input type="radio"/>
7-14 days	<input type="radio"/>	31 or more days	<input type="radio"/>

5. In the past 6 months, how much has your low back pain interfered with your daily activities rated on a 0-10 scale where 0 is "no interference" and 10 is "unable to carry on any activities"?

No interference Unable to carry on any activities

0      1      2      3      4      5      6      7      8      9      10

6. In the past 6 months, how much has your low back pain changed your ability to take part in recreational, social and family activities where 0 is "no change" and 10 is "extreme change"?

No change Extreme change

0      1      2      3      4      5      6      7      8      9      10

7. In the past 6 months, how much has your low back pain changed your ability to work (including housework) where 0 is "no change" and 10 is "extreme change"?

No change Extreme change

0      1      2      3      4      5      6      7      8      9      10



**Section C. How you manage your pain**

**Answer this section (page 15-17) if you have had neck or low back pain.**

1. **In the past four weeks**, have you used medication every day for at least seven days because of your neck pain or back pain? No.... ☐ → (skip to question 2)  
Yes... ☐

If yes, did you use prescription medication, non-prescription medication or both ?

a) Neck pain..... Non-prescription medication ☐ Prescription medication ☐

b) Low back pain... Non-prescription medication ☐ Prescription medication ☐

2. **In the past four weeks**, have you seen a health care professional for neck pain or low back pain?

Neck pain	Yes <input type="radio"/>	No <input type="radio"/>
Low back pain	Yes <input type="radio"/>	No <input type="radio"/>

If you have seen any health care professionals for neck pain or low back pain **in the past four weeks**, who did you see? (please check all that apply)

	For your neck pain	For your low back pain
Family Doctor	Yes <input type="radio"/>	Yes <input type="radio"/>
Chiropractor	Yes <input type="radio"/>	Yes <input type="radio"/>
Physiotherapist	Yes <input type="radio"/>	Yes <input type="radio"/>
Orthopedic Surgeon	Yes <input type="radio"/>	Yes <input type="radio"/>
Neurologist or Neurosurgeon	Yes <input type="radio"/>	Yes <input type="radio"/>
Rheumatologist	Yes <input type="radio"/>	Yes <input type="radio"/>
Massage therapist	Yes <input type="radio"/>	Yes <input type="radio"/>
Counsellor/Psychologist	Yes <input type="radio"/>	Yes <input type="radio"/>
Other: (please specify) _____	Yes <input type="radio"/>	Yes <input type="radio"/>

3. If you have ever been treated for neck pain or low back pain, please indicate whether the treatment helped or not?

	Neck pain	Low back pain
<b>Pills (medication)</b>	Helped <input type="radio"/> Did not help <input type="radio"/>	Helped <input type="radio"/> Did not help <input type="radio"/>
<b>Chiropractic</b>	Helped <input type="radio"/> Did not help <input type="radio"/>	Helped <input type="radio"/> Did not help <input type="radio"/>
<b>Physiotherapy</b>	Helped <input type="radio"/> Did not help <input type="radio"/>	Helped <input type="radio"/> Did not help <input type="radio"/>
<b>Bed rest</b>	Helped <input type="radio"/> Did not help <input type="radio"/>	Helped <input type="radio"/> Did not help <input type="radio"/>
<b>Massage Therapy</b>	Helped <input type="radio"/> Did not help <input type="radio"/>	Helped <input type="radio"/> Did not help <input type="radio"/>
<b>Back brace (corset)</b>	Helped <input type="radio"/> Did not help <input type="radio"/>	Helped <input type="radio"/> Did not help <input type="radio"/>
<b>Injection(s)</b>	Helped <input type="radio"/> Did not help <input type="radio"/>	Helped <input type="radio"/> Did not help <input type="radio"/>
<b>Surgery</b>	Helped <input type="radio"/> Did not help <input type="radio"/>	Helped <input type="radio"/> Did not help <input type="radio"/>
<b>Back School</b>	Helped <input type="radio"/> Did not help <input type="radio"/>	Helped <input type="radio"/> Did not help <input type="radio"/>
<b>Counselling or Psychotherapy</b>	Helped <input type="radio"/> Did not help <input type="radio"/>	Helped <input type="radio"/> Did not help <input type="radio"/>
<b>Exercise</b>	Helped <input type="radio"/> Did not help <input type="radio"/>	Helped <input type="radio"/> Did not help <input type="radio"/>
<b>Neck Collar</b>	Helped <input type="radio"/> Did not help <input type="radio"/>	Helped <input type="radio"/> Did not help <input type="radio"/>
<b>Other: (please specify)</b> _____	Helped <input type="radio"/> Did not help <input type="radio"/>	Helped <input type="radio"/> Did not help <input type="radio"/>

Have you ever suffered from moderate neck or back pain? No.... ☐ → (skip to page 18)

Yes... ☐



**We would like to know how frequently you have the following thoughts or engage in the following behaviours only when your pain is at a MODERATE level of intensity or greater. Please indicate how frequently you do the following when experiencing pain by checking the appropriate circle next to each statement.**

- Check ①    Never do when in pain  
 Check ②    Rarely do when in pain  
 Check ③    Occasionally do when in pain  
 Check ④    Frequently do when in pain  
 Check ⑤    Very frequently do when in pain

- |  |   |   |   |   |   |
|--|---|---|---|---|---|
| 1. Engaging in physical exercise or physical therapy.....  | ① | ② | ③ | ④ | ⑤ |
| 2. Saying to yourself, "I wish my doctor would prescribe better pain medication for me".....                           | ① | ② | ③ | ④ | ⑤ |
| 3. Staying busy or active.....   | ① | ② | ③ | ④ | ⑤ |
| 4. Clearing your mind of bothersome thoughts or worries.   | ① | ② | ③ | ④ | ⑤ |
| 5. Thinking, "This pain is wearing me down.".....  | ① | ② | ③ | ④ | ⑤ |
| 6. Talking to others about how much your pain hurts.....   | ① | ② | ③ | ④ | ⑤ |
| 7. Restricting or cancelling your social activities.....   | ① | ② | ③ | ④ | ⑤ |
| 8. Participating in leisure activities (such as hobbies, sewing, stamp collecting etc.).....                           | ① | ② | ③ | ④ | ⑤ |
| 9. Thinking, "I can't do anything to lessen this pain".....  | ① | ② | ③ | ④ | ⑤ |
| 10. Distracting your attention from the pain (recognizing you have pain, but putting your mind on something else)..... | ① | ② | ③ | ④ | ⑤ |
| 11. Focusing on where the pain is and how much it hurts..  | ① | ② | ③ | ④ | ⑤ |

**Section D. Questions about your mood.**

**Using the scale below, indicate the number which best describes how often you felt or behaved this way – DURING THE PAST WEEK.**

- 0 = Rarely or none of the time (less than 1 day)  
1 = Some or a little of the time (1-2 days)  
2 = Occasionally or a moderate amount of time (3-4 days)  
3 = Most or all of the time (5-7 days)

**DURING THE PAST WEEK:**

- \_\_\_\_\_ 1. I was bothered by things that usually don't bother me.
- \_\_\_\_\_ 2. I did not feel like eating; my appetite was poor.
- \_\_\_\_\_ 3. I felt that I could not shake off the blues even with help from my family or friends.
- \_\_\_\_\_ 4. I felt that I was just as good as other people.
- \_\_\_\_\_ 5. I had trouble keeping my mind on what I was doing.
- \_\_\_\_\_ 6. I felt depressed.
- \_\_\_\_\_ 7. I felt that everything I did was an effort.
- \_\_\_\_\_ 8. I felt hopeful about the future.
- \_\_\_\_\_ 9. I thought my life had been a failure.
- \_\_\_\_\_ 10. I felt fearful.
- \_\_\_\_\_ 11. My sleep was restless.
- \_\_\_\_\_ 12. I was happy.
- \_\_\_\_\_ 13. I talked less than usual.
- \_\_\_\_\_ 14. I felt lonely.
- \_\_\_\_\_ 15. People were unfriendly.
- \_\_\_\_\_ 16. I enjoyed life.
- \_\_\_\_\_ 17. I had crying spells.
- \_\_\_\_\_ 18. I felt sad.
- \_\_\_\_\_ 19. I felt that people disliked me.
- \_\_\_\_\_ 20. I could not get "going".

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**How satisfied would you say you are with your life? (please check the most appropriate answer)**

- Very dissatisfied..... ☐
- Dissatisfied..... ☐
- Neither satisfied nor dissatisfied.... ☐
- Satisfied..... ☐
- Very satisfied ..... ☐

**Section E. About You.**

1. Male ☐ Female ☐ ➔ Are you currently pregnant? Yes ☐  
No ☐

2. Date of Birth: day\_\_\_\_\_ month\_\_\_\_\_ year\_\_\_\_\_

3. Height: Feet \_\_\_\_\_ Inches \_\_\_\_\_ Weight: Pounds \_\_\_\_\_

4. Check your current marital status:

Married/Common Law..... ☐  
Separated/Divorced..... ☐  
Widowed..... ☐  
Single..... ☐

5. Check your highest education level:

Grade 8 or less..... ☐  
Higher than Grade 8, but did not graduate from high school... ☐  
High School Graduate..... ☐  
Post secondary or some university..... ☐  
University Graduate..... ☐

6. What is your household's total yearly income before taxes?

\$0 - \$20,000..... ☐  
\$20,001-\$40,000..... ☐  
\$40,001-\$ 60,000..... ☐  
Above \$60,000..... ☐

7. What is your present employment status?

Full-time .....	<input type="radio"/>	Part-time.....	<input type="radio"/>
Homemaker.....	<input type="radio"/>	Student.....	<input type="radio"/>
Unemployed.....	<input type="radio"/>	Retired.....	<input type="radio"/>
Maternity leave.....	<input type="radio"/>	Disability leave.....	<input type="radio"/>
Compensation.....	<input type="radio"/>		

8. **Main work activity:** (please check main one)

- |                              |                       |                                    |                       |
|------------------------------|-----------------------|------------------------------------|-----------------------|
| Heavy labour .....           | <input type="radio"/> | Light labour.....                  | <input type="radio"/> |
| Mostly sitting at desk ..... | <input type="radio"/> | Driving, operating a vehicle.....  | <input type="radio"/> |
| Mostly standing.....         | <input type="radio"/> | Mostly walking, moving around..... | <input type="radio"/> |

9. What is your main occupation. \_\_\_\_\_  
(Please Print)

10. If you are currently employed, how satisfied would you say you are with your job?  
(please check the most appropriate answer)

- |  |                       |
|--|-----------------------|
| Very dissatisfied .....                  | <input type="radio"/> |
| Dissatisfied .....                       | <input type="radio"/> |
| Neither satisfied nor dissatisfied ..... | <input type="radio"/> |
| Satisfied .....                          | <input type="radio"/> |
| Very satisfied .....                     | <input type="radio"/> |

11. During the last 6 months, on average, how many days a week have you engaged  
in 30 minutes or more of exercise? (please circle the appropriate number of days)

0      1      2      3      4      5      6      7      days/week

12. Where do you currently live? (please check one)

- |  |                       |
|--|-----------------------|
| Large city (population more than 100,000).....           | <input type="radio"/> |
| Small city (population 5,000 - 100,000).....             | <input type="radio"/> |
| Town (population 500 - 4,999).....                       | <input type="radio"/> |
| Village (population 100 - 499).....                      | <input type="radio"/> |
| Rural municipality but not in city, town or village..... | <input type="radio"/> |
| Reserve.....   | <input type="radio"/> |

Page 21

**Comments**

If you have any comments about this study, please write them below.

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Thank you for your participation.

**Please fold this questionnaire, place it in the enclosed stamped self-addressed envelope and return it as soon as possible. Thank you for helping us.**

## APPENDIX E



**AQ**

**Claim No.:** \_\_\_\_\_

**ACCIDENT QUESTIONNAIRE**

**Please print:**

**Name:**      **Surname:**      **First Name:**      **Second Initial:**

\_\_\_\_\_

**Address:**      **Street/Postal Box:**

\_\_\_\_\_

**City/Town:**

**Postal Code:**

\_\_\_\_\_

**Phone:**

**Home :**

**Work:**

\_\_\_\_\_

# AQ

Please answer **all** questions.

check the appropriate space ☒ 1 or write answers where applicable.

## A. Personal information

1. Today's Date: Day \_\_\_\_ Month \_\_\_\_ Year 19 \_\_\_\_

2. Male ☐ 1 Female ☐ 2

3. Date of birth: Day \_\_\_\_ Month \_\_\_\_ Year 19 \_\_\_\_

4. Height: Feet \_\_\_\_ Inches \_\_\_\_ Weight: Pounds \_\_\_\_

5. Marital status (please check one) .....Married/Common Law ☐ 1  
 Separated/Divorced ☐ 2  
 Widowed ☐ 3  
 Single ☐ 4

6. Number of dependents: \_\_\_\_ (children and others)

7. Education level: (check highest level).....Grade 8 or less ☐ 1  
 Higher than Grade 8, but did not graduate from high school ☐ 2  
 High school graduate ☐ 3  
 Post-secondary or some university ☐ 4  
 University graduate ☐ 5

8. Combined family income:\$0 — \$20,000 ☐ 1 \$20,001 — \$40,000 ☐ 2  
 \$40,001 — \$60,000 ☐ 3 Above \$60,000 ☐ 4

9. Employment status: .....Full-time ☐ 1 Part-time ☐ 2  
 (please check one) Homemaker ☐ 3 Student ☐ 4  
 Unemployed ☐ 5 Retired ☐ 6

10. Main work activity: .....Heavy labor ☐ 1 Light labor ☐ 2  
 (please check one) Mostly sitting at a desk ☐ 3 Driving or operating a vehicle ☐ 4  
 Mostly standing ☐ 5 Mostly walking or moving about ☐ 6

# AQ

## B. Accident information

1. Date of accident: Day \_\_\_\_ Month \_\_\_\_ Year 19\_\_\_\_

2. When did the accident occur? (please check one)

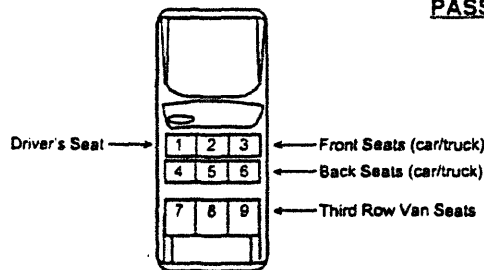
Night ☐ 1 Day ☐ 2  
Sunrise ☐ 3 Sunset ☐ 4

3. Where were you seated during the accident?

(Refer to the seat number in vehicle diagram)

**DRIVER'S SIDE**

**PASSENGER'S SIDE**



I was sitting in seat number \_\_\_\_ (Choose between 1 and 9)

or, I was a passenger in a bus

or, I was on a motorcycle

or, I was on a bicycle

or, I was a pedestrian

☐ 10  
☐ 11  
☐ 12  
☐ 13

4. From which direction was the "main" impact to your vehicle? (please check one)

Front ☐ 1 Rear ☐ 2 Driver's side ☐ 3 Passenger's side ☐ 4

5. Did your vehicle roll over? .... No ☐ 1 Yes ☐ 2 Do not know ☐ 3

6. Was your vehicle drivable after the accident?.... No ☐ 1 Yes ☐ 2 Do not know ☐ 3

7. Type of road:

Provincial highway ☐ 1 Rural road ☐ 2 Urban street ☐ 3  
Private property ☐ 4 Other location ☐ 5 Do not know ☐ 6

8. Condition of road surface:..... Dry ☐ 1 Wet ☐ 2 Icy ☐ 3

9. Was your car stopped at the time of the accident?

No ☐ 1  
Yes ☐ 2

Do not know ☐ 3

## AQ 11.1-11.5

10. Was the seat belt fastened?... No ☐ 1 Yes, lap ☐ 2  
Yes, lap and shoulder ☐ 3 Do not know ☐ 4
11. Was there a head rest?.....No ☐ 1 Yes, fixed ☐ 2  
Yes, adjustable ☐ 3 Yes, type unknown ☐ 4  
Do not know ☐ 5
12. Head position at moment of impact:....Straight forward ☐ 1 Turned to right ☐ 2  
Turned to left ☐ 3 Do not know ☐ 4
13. Have you hired a lawyer to help you with your claim?..... No ☐ 1 Yes ☐ 2
14. Did you go to the hospital immediately after the accident?..... No ☐ 1 Yes ☐ 2
- If yes, were you admitted over night? No ☐ 1 Yes ☐ 2.... For how many days were you in hospital? \_\_\_\_\_
- Are you still in the hospital? No ☐ 1 Yes ☐ 2

### C. Post-accident symptoms/pains

1. Did you have any type of symptoms/pains after the accident?  
No ☐ 1 (skip to part E)  
Yes ☐ 2 (continue below)
2. Symptoms/pains in which part(s) of the body? (check all that apply)
- |           |                                |                           |                                |
|-----------|--------------------------------|---------------------------|--------------------------------|
| Head/Face | Yes <input type="checkbox"/> 2 | Neck/Shoulder             | Yes <input type="checkbox"/> 2 |
| Arm(s)    | <input type="checkbox"/> 2     | Back                      | <input type="checkbox"/> 2     |
| Leg(s)    | <input type="checkbox"/> 2     | Other part(s) of the body | <input type="checkbox"/> 2     |
3. Did you visit a doctor?.....No ☐ 1  
Yes, the day of the collision ☐ 2  
Yes, the day after the collision ☐ 3  
Yes, the second day after the collision ☐ 4  
Yes, the third day after the collision ☐ 5  
More than three days after the collision ☐ 6
4. Did you visit a chiropractor?.....No ☐ 1  
Yes, the day of the collision ☐ 2  
Yes, the day after the collision ☐ 3  
Yes, the second day after the collision ☐ 4  
Yes, the third day after the collision ☐ 5  
More than three days after the collision ☐ 6
5. Did you visit a physiotherapist? .....No ☐ 1  
Yes, the day of the collision ☐ 2  
Yes, the day after the collision ☐ 3  
Yes, the second day after the collision ☐ 4  
Yes, the third day after the collision ☐ 5  
More than three days after the collision ☐ 6

## AQ

6. Were you off work due to the accident?..... No ☐ 1  
 Yes ☐ 2...How many days have you been off work so far? \_\_\_\_\_ days  
 If yes, are you still off work?... No ☐ 1 Yes ☐ 2

7. If you are working, are you working reduced hours because of the accident?... No ☐ 1 Yes ☐ 2

### D. Symptoms

Have you felt the following symptoms since the accident? (please check the appropriate box)

Symptoms	If not, check "no".		If "yes", when did the symptoms "begin"?				
	No	Yes.....	Day of accident	Day after accident	Third day	Fourth day	Later than fourth day
1. Neck/shoulder pain	<input type="checkbox"/> 1	<input type="checkbox"/> 2 .....	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
2. Reduced/painful neck movement	<input type="checkbox"/> 1	<input type="checkbox"/> 2 .....	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
3. Headache	<input type="checkbox"/> 1	<input type="checkbox"/> 2 .....	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
4. Reduced/painful jaw movement	<input type="checkbox"/> 1	<input type="checkbox"/> 2 .....	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
5. Feeling of numbness, tingling or pain in arms or hands	<input type="checkbox"/> 1	<input type="checkbox"/> 2 .....	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
6. Feeling of numbness, tingling or pain in legs or feet	<input type="checkbox"/> 1	<input type="checkbox"/> 2 .....	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
7. Dizziness or unsteadiness	<input type="checkbox"/> 1	<input type="checkbox"/> 2 .....	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
8. Nausea	<input type="checkbox"/> 1	<input type="checkbox"/> 2 .....	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
9. Vomiting	<input type="checkbox"/> 1	<input type="checkbox"/> 2 .....	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
10. Difficulty swallowing	<input type="checkbox"/> 1	<input type="checkbox"/> 2 .....	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
11. Ringing in the ears	<input type="checkbox"/> 1	<input type="checkbox"/> 2 .....	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
12. Memory problems	<input type="checkbox"/> 1	<input type="checkbox"/> 2 .....	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
13. Concentration problems	<input type="checkbox"/> 1	<input type="checkbox"/> 2 .....	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
14. Vision problems	<input type="checkbox"/> 1	<input type="checkbox"/> 2 .....	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
15. Lower back pain	<input type="checkbox"/> 1	<input type="checkbox"/> 2 .....	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
16. Did you lose consciousness?..... No <input type="checkbox"/> 1 Yes <input type="checkbox"/> 2 Uncertain <input type="checkbox"/> 3							
17. Did you hit your head?..... No <input type="checkbox"/> 1 Yes <input type="checkbox"/> 2 Uncertain <input type="checkbox"/> 3							
18. Did you break any bones?..... No <input type="checkbox"/> 1 Yes <input type="checkbox"/> 2 Uncertain <input type="checkbox"/> 3							

# AQ

19. Describe any other symptoms, pains or injuries:

## E. Your general health before the accident

1. How was your health the month before the accident?

Excellent ☐ 1 Very good ☐ 2 Good ☐ 3 Fair ☐ 4 Poor ☐ 5

2. How did you feel before the accident? (please check the appropriate box for each condition)

Condition	Never or almost never	Sometimes, every month	Very often, every week	Every day
1. Headache	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
2. Ache/pain in the lower back	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
3. Ache/pain in the neck/shoulder	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
4. Ache/pain in jaw	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
5. Bodily discomfort	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
6. Tired and lack of energy	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
7. Depressed	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
8. Sleeping problems	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
9. Anxious or nervous	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
10. Memory problems	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
11. Concentration problems	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
12. Angry	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
13. Frustrated	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
14. Fearful	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4

3. Have you been injured in a motor vehicle accident "in the past"?

No ☐ 1 (skip to part F)  
Yes ☐ 2 (continue below)

4. If you have been injured in a motor vehicle accident "in the past", which parts of your body were injured? (check all that apply)

Head/Face	Yes <input type="checkbox"/> 2	Neck/Shoulder	Yes <input type="checkbox"/> 2
Arm(s)	<input type="checkbox"/> 2	Back	<input type="checkbox"/> 2
Leg(s)	<input type="checkbox"/> 2	Other part(s) of the body	<input type="checkbox"/> 2

# AQ 5

## F. Pain drawing

1. Do you have pain as a result of this recent accident?

No

☐ 1

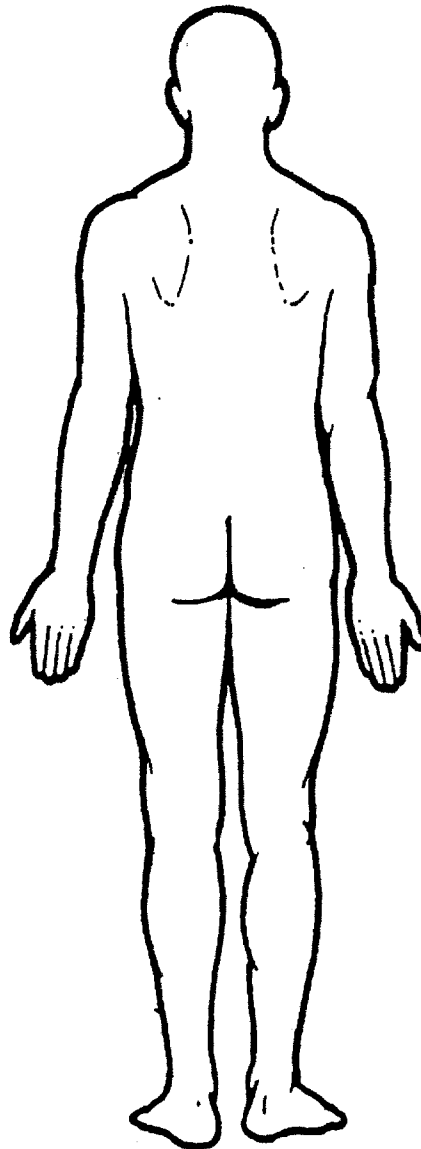
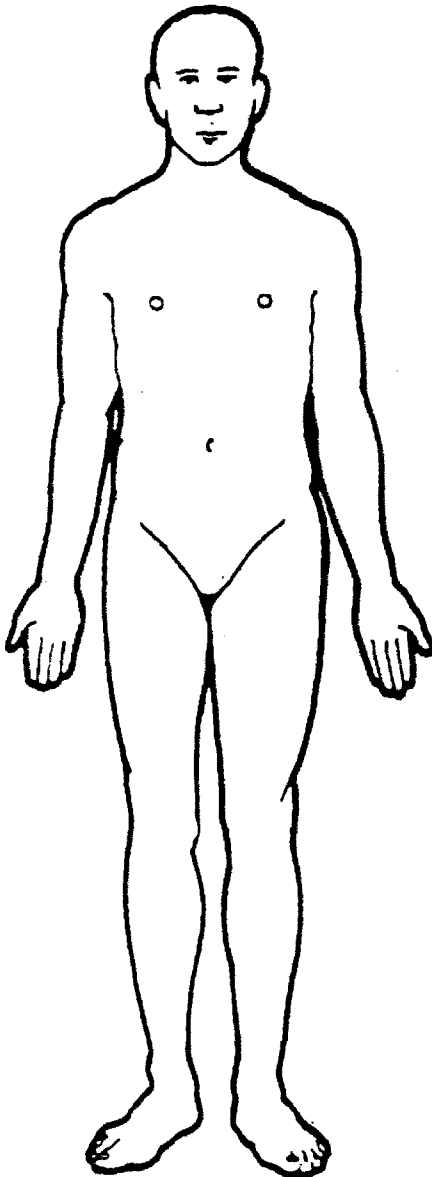
(skip to part G)

Yes

☐ 2

(continue below)

Carefully shade in or mark the areas where you feel any pain on the drawings below.



### FOR OFFICE USE ONLY:

Number of areas: \_\_\_\_\_

Percentage of body: \_\_\_\_\_

Injury code(s): \_\_\_\_\_  
 \_\_\_\_\_

# AQ

2. Did the accident cause **neck/shoulder** pain?

No ☐ 1 (skip to question 5 below);  
Yes ☐ 2 (continue with question 3 below).

3. On the line below, mark one point between "No Pain" and "Pain as Bad as it Could be" to indicate how severe your **neck/shoulder** pain is now.

No Pain \_\_\_\_\_ Pain as Bad as it Could be

4. On the line below, mark one point between "No Pain" and "Pain as Bad as it Could be" to indicate how severe your **neck/shoulder** pain is usually since the accident.

No Pain \_\_\_\_\_ Pain as Bad as it Could be

5. Did the accident cause **headaches**? No ☐ 1 (skip to question 8 below);  
Yes ☐ 2 (continue with question 6 below).

6. On the line below, mark one point between "No Pain" and "Pain as Bad as it Could be" to indicate how severe your **headache** pain is now.

No Pain \_\_\_\_\_ Pain as Bad as it Could be

7. On the line below, mark one point between "No Pain" and "Pain as Bad as it Could be" to indicate how severe your **headache** pain is usually since the accident.

No Pain \_\_\_\_\_ Pain as Bad as it Could be

8. Did the accident cause **pain** in areas **other** than your head, neck and shoulder regions?

No ☐ 1 (skip to part G);  
Yes ☐ 2 (continue with question 9 below).

9. On the line below, mark one point between "No Pain" and "Pain as Bad as it Could be" to indicate how severe your **other** pain is now.

No Pain \_\_\_\_\_ Pain as Bad as it Could be

10. On the line below, mark one point between "No Pain" and "Pain as Bad as it Could be" to indicate how severe your **other** pain is usually since the accident.

No Pain \_\_\_\_\_ Pain as Bad as it Could be

OFFICE  
USE

3 \_\_\_\_\_

4 \_\_\_\_\_

6 \_\_\_\_\_

7 \_\_\_\_\_

9 \_\_\_\_\_

10 \_\_\_\_\_



## **Consent Form**

If you consent to being in this study, please sign your name below and have someone witness your signature. Keep one copy of this consent for your own records.

\_\_\_\_\_  
(Signed)

\_\_\_\_\_  
(Date)

\_\_\_\_\_  
(Witness)

\_\_\_\_\_  
(Date)

If you agree to participate in this study, please fill out the remaining questionnaires. Then place one copy of this consent form with the completed questionnaires in the self-addressed, stamped envelope provided, seal it, and mail the packet to the Centre for Neuromusculoskeletal Health. If you have any questions about filling out the questionnaires, please call the Centre for Neuromusculoskeletal Health.

CQ

### **G. Consent form**

The Centre for Neuromusculoskeletal Health at the Royal University Hospital and University of Saskatchewan has established a research unit to study and treat motor vehicle injuries in Saskatchewan. These injuries are a big problem in Saskatchewan because, although some people heal quickly, others suffer considerable pain, disability, family and social disruption, and economic hardship. There are approximately 9,000 personal injuries from motor vehicle accidents each year in Saskatchewan, and yet there has been little research into what factors determine how quickly people recover, what kinds of injuries heal more quickly, or what treatments are the most effective for these injuries. In order to find answers to these questions, the Centre for Neuromusculoskeletal Health has put together a group of experts in this field at the University of Saskatchewan.

The Centre for Neuromusculoskeletal Health has asked SGI to work with us in gathering information. We are also asking for your help in providing information about injuries by filling out some brief questionnaires. These questionnaires will take approximately 1/2 hour of your time, and will ask questions about your accident and injury, how you are coping, and how the injury is affecting your general well-being. If you agree to help us by participating in this study, we will be sending you questionnaires over the next year, so that we can learn from your experience. We will mail to you no more than four sets of questionnaires over the next year, and will provide you with self-addressed, stamped envelopes so that there will be no costs to you.

If you agree to participate in our study, SGI will provide us with a copy of your personal injury claim form. However, SGI will not have access to the results of the questionnaires that you fill out for our study. At the end of the study, all the information will be combined and reported, but you will not be identified in this report, and there will be no way of knowing which information came from which person. All information will be kept secure at the Centre for Neuromusculoskeletal Health at the Royal University Hospital in Saskatoon.

You are under no obligation to participate in our study, and your participation in our study will not affect your claim with SGI. However, we believe that this research will lead to a better understanding of injuries like yours and better treatment for these problems. The more people that agree to participate in this study, the more knowledge we will gain about these problems. We ask for your participation even if you do not have pain or symptoms at this time. Anyone who agrees to be in this study can withdraw at any time; this decision will in no way influence your claim. We will advise you of any new information that will have a bearing on your decision to continue with the study. At the end of the study, we will ask all participants if they want a summary of our results, and we will send this summary to anyone who is interested.

If, during the course of this study, you have questions or concerns about your participation, please feel free to call or write to:

Research Officer,  
Centre for Neuromusculoskeletal Health  
Royal University Hospital  
Saskatoon, Saskatchewan,  
S7N 0W8

Phone: 966-8465 in Saskatoon and 1-800-667-8505 outside of Saskatoon.

Researchers  
Dr. K. Yong-Hing, Dr. David Cassidy and Dr. Linda Carroll

Please see other side

### **Consent Form**

If you consent to being in this study, please sign your name below and have someone witness your signature. Keep one copy of this consent for your own records.

\_\_\_\_\_  
(Signed)

\_\_\_\_\_  
(Date)

\_\_\_\_\_  
(Witness)

\_\_\_\_\_  
(Date)

If you agree to participate in this study, please fill out the remaining questionnaires. Then place one copy of this consent form with the completed questionnaires in the self-addressed, stamped envelope provided, seal it, and mail the packet to the Centre for Neuromusculoskeletal Health. If you have any questions about filling out the questionnaires, please call the Centre for Neuromusculoskeletal Health.

# CQ

## Section H

Today's date: Day \_\_\_\_\_ Month \_\_\_\_\_ Year \_\_\_\_\_

Using the scale below, indicate the number which best describes how often you felt or behaved this way  
**DURING THE PAST WEEK.**

0 = Rarely or none of the time (less than 1 day)

1 = Some or a little of the time (1-2 days)

2 = Occasionally or a moderate amount of time (3-4 days)

3 = Most or all of the time (5-7 days)

### During the past week:

- \_\_\_\_ 1. I was bothered by things that usually don't bother me.
  - \_\_\_\_ 2. I did not feel like eating; my appetite was poor.
  - \_\_\_\_ 3. I felt that I could not shake off the blues even with help from my family or friends.
  - \_\_\_\_ 4. I felt that I was just as good as other people.
  - \_\_\_\_ 5. I had trouble keeping my mind on what I was doing.
  - \_\_\_\_ 6. I felt depressed.
  - \_\_\_\_ 7. I felt that everything I did was an effort.
  - \_\_\_\_ 8. I felt hopeful about the future.
  - \_\_\_\_ 9. I thought my life had been a failure.
  - \_\_\_\_ 10. I felt fearful.
  - \_\_\_\_ 11. My sleep was restless.
  - \_\_\_\_ 12. I was happy.
  - \_\_\_\_ 13. I talked less than usual.
  - \_\_\_\_ 14. I felt lonely.
  - \_\_\_\_ 15. People were unfriendly.
  - \_\_\_\_ 16. I enjoyed life.
  - \_\_\_\_ 17. I had crying spells.
  - \_\_\_\_ 18. I felt sad.
  - \_\_\_\_ 19. I felt that people disliked me.
  - \_\_\_\_ 20. I could not get "going".
- 

### I. Smoking Information

Do you smoke cigarettes? .....No ☐ 1 Yes ☐ 2

How many years have you smoked cigarettes? \_\_\_\_\_ years.

How many cigarettes do you smoke per day? \_\_\_\_\_ cigarettes.  
(Please give best estimate; one pack = 25 cigarettes)

CQ

Section J

## SF-36 HEALTH STATUS SURVEY/CANADA

**INSTRUCTIONS:** This survey asks for your views about your health. This information will help keep track of how you feel and how well you are able to do your usual activities.

Answer every question by marking the answer as indicated. If you are unsure about how to answer a question, please give the best answer you can.

1. In general, would you say your health is:

(circle one)

- |                 |   |
|-----------------|---|
| Excellent ..... | 1 |
| Very good ..... | 2 |
| Good .....      | 3 |
| Fair .....      | 4 |
| Poor .....      | 5 |

2. Compared to one year ago, how would you rate your health in general now?

(circle one)

- |   |   |
|---|---|
| Much better now than one year ago .....     | 1 |
| Somewhat better now than one year ago ..... | 2 |
| About the same as one year ago .....        | 3 |
| Somewhat worse now than one year ago .....  | 4 |
| Much worse now than one year ago .....      | 5 |

# CQ

3. The following items are about activities you might do during a typical day. Does your health now limit you in these activities? If so, how much?

(circle one number on each line)

ACTIVITIES	Yes, Limited A Lot	Yes, Limited A Little	No, Not Limited At All
a. Vigorous activities, such as running, lifting heavy objects, participating in strenuous sports	1	2	3
b. Moderate activities, such as moving a table, pushing a vacuum cleaner, bowling, or playing golf	1	2	3
c. Lifting or carrying groceries	1	2	3
d. Climbing <b>several</b> flights of stairs	1	2	3
e. Climbing <b>one</b> flight of stairs	1	2	3
f. Bending, kneeling, or stooping	1	2	3
g. Walking <b>more than a kilometre</b>	1	2	3
h. Walking <b>several blocks</b>	1	2	3
i. Walking <b>one block</b>	1	2	3
j. Bathing or dressing yourself	1	2	3

4. During the past 4 weeks have you had any of the following problems with your work or other regular daily activities as a result of your physical health?

(circle one number on each line)

	YES	NO
a. Cut down the <b>amount of time</b> you spent on work or other activities.	1	2
b. <b>Accomplished less</b> than you would like	1	2
c. Were limited in the kind of work or other activities	1	2
d. Had <b>difficulty</b> performing the work or other activities (for example, it took extra effort)	1	2

5. During the past 4 weeks, have you had any of the following problems with your work or other regular daily activities as a result of any emotional problems (such as feeling depressed or anxious)?

(circle one number on each line)

	YES	NO
a. Cut down the <b>amount of time</b> you spent on work or other activities	1	2
b. <b>Accomplished less</b> than you would like	1	2
c. Didn't do work or other activities <b>as carefully as usual</b>	1	2

## CQ

6. During the past 4 weeks, to what extent has your physical health or emotional problems interfered with your normal social activities with family, friends, neighbours, or groups?

(circle one)

- Not at all ..... 1
- Slightly ..... 2
- Moderately ..... 3
- Quite a bit ..... 4
- Extremely ..... 5

7. How much bodily pain have you had during the past 4 weeks?

(circle one)

- None ..... 1
- Very mild ..... 2
- Mild ..... 3
- Moderate ..... 4
- Severe ..... 5
- Very severe ..... 6

8. During the past 4 weeks, how much did pain interfere with your normal work (including both work outside the home and housework)?

(circle one)

- Not at all ..... 1
- A little bit ..... 2
- Moderately ..... 3
- Quite a bit ..... 4
- Extremely ..... 5

**FQ**

**CENTRE FOR NEUROMUSCULOSKELETAL HEALTH**

Royal University Hospital, University of Saskatchewan,  
Saskatoon, Saskatchewan  
S7N 0W8

Thank you again for agreeing to participate in our study on how you are coping with your recent injury and how the injury is affecting your general well-being. This information will help us to design better treatment programs for people like you.

Please fill out the enclosed questionnaires, even if you do not have pain or symptoms at this time. We are interested in problems that you may have developed since the last questionnaire. Please return the completed questionnaires in the self-addressed, stamped envelope that we have provided for you.

**We would like to remind you that this information is confidential and will not be released to SGI or anyone else. You may withdraw from the study at any time without any influence on your claim with SGI.**

We need as many people as possible participating in this study, in order to ensure that the results are accurate and useful in understanding the problems that people develop after motor vehicle accidents.

If you have any questions or concerns about your participation in this study, please feel free to call or write:

Research Officer  
Centre for Neuromusculoskeletal Health  
Royal University Hospital  
Saskatoon, Saskatchewan  
S7N 0W8  
Phone: 966-8465 in Saskatoon and 1-800-667-8505 outside of Saskatoon.

Dr. Ken Yong-Hing  
Medical Director

Dr. David Cassidy  
Research Director

Dr. Linda Carroll  
Registered Psychologist



FQ

## FOLLOW-UP QUESTIONNAIRE

### A. Symptoms caused by the accident

What is today's date? Day \_\_\_\_\_ Month \_\_\_\_\_ Year 19\_\_\_\_

Have you felt the following symptoms in the past two weeks? (please check the appropriate box).

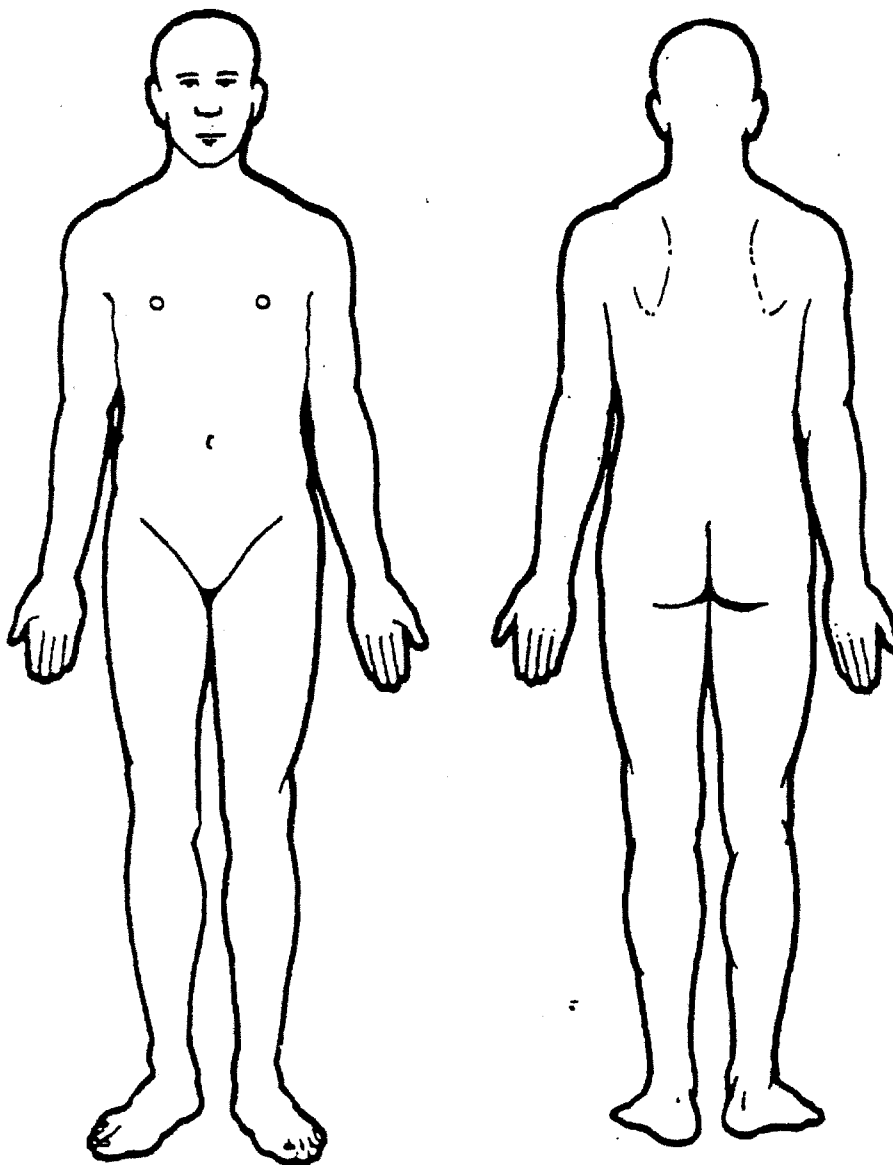
If not, check "No". If "Yes", are these symptoms the result of the accident?						
Symptoms	No	Yes		No	Yes	Do not know
1. Neck/shoulder pain	<input type="checkbox"/> 1	<input type="checkbox"/> 2	.....	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3
2. Reduced/painful neck movement	<input type="checkbox"/> 1	<input type="checkbox"/> 2	.....	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3
3. Headache	<input type="checkbox"/> 1	<input type="checkbox"/> 2	.....	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3
4. Reduced/painful jaw movement	<input type="checkbox"/> 1	<input type="checkbox"/> 2	.....	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3
5. Feeling of numbness, tingling or pain in arms or hands	<input type="checkbox"/> 1	<input type="checkbox"/> 2	.....	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3
6. Feeling of numbness, tingling or pain in legs or feet	<input type="checkbox"/> 1	<input type="checkbox"/> 2	.....	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3
7. Dizziness or unsteadiness	<input type="checkbox"/> 1	<input type="checkbox"/> 2	.....	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3
8. Ringing in the ears	<input type="checkbox"/> 1	<input type="checkbox"/> 2	.....	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3
9. Memory problems	<input type="checkbox"/> 1	<input type="checkbox"/> 2	.....	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3
10. Concentration problems	<input type="checkbox"/> 1	<input type="checkbox"/> 2	.....	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3
11. Vision problems	<input type="checkbox"/> 1	<input type="checkbox"/> 2	.....	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3
12. Lower back pain	<input type="checkbox"/> 1	<input type="checkbox"/> 2	.....	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3

# FQ

## B. Pain drawing and information

1. Do you have pain as a result of the accident?..... No ☐ 1 (skip to question 16)  
Yes ☐ 2 (continue below)

Carefully shade in or mark the areas where you feel any pain on the drawings below.



### FOR OFFICE USE ONLY:

Number of areas: \_\_\_\_\_

Percentage of body: \_\_\_\_\_

Injury code(s): \_\_\_\_\_

\_\_\_\_\_

# FQ

2. Did the accident cause **neck/shoulder pain**?

No ☐ 1

(skip to question 5 below);

Yes ☐ 2

(continue with question 3 below).

3. On the line below, mark one point between "No Pain" and "Pain as Bad as it Could be" to indicate how severe your **neck/shoulder pain** is now.

No Pain \_\_\_\_\_ Pain as Bad as it Could be

OFFICE USE

3. \_\_\_\_\_

4. On the line below, mark one point between "No Pain" and "Pain as Bad as it Could be" to indicate how severe your **neck/shoulder pain** is usually (over the last two weeks).

No Pain \_\_\_\_\_ Pain as Bad as it Could be

4. \_\_\_\_\_

5. Did the accident cause **headaches**?

No ☐ 1

(skip to question 8 below);

Yes ☐ 2

(continue with question 6 below).

6. On the line below, mark one point between "No Pain" and "Pain as Bad as it Could be" to indicate how severe your **headache pain** is now.

No Pain \_\_\_\_\_ Pain as Bad as it Could be

6. \_\_\_\_\_

7. On the line below, mark one point between "No Pain" and "Pain as Bad as it Could be" to indicate how severe your **headache pain** is usually (over the last two weeks).

No Pain \_\_\_\_\_ Pain as Bad as it Could be

7. \_\_\_\_\_

8. Did the accident cause pain in areas **other** than your head, neck and shoulder regions?

No ☐ 1

(skip to question 11);

Yes ☐ 2

(continue with question 9 below).

9. On the line below, mark one point between "No Pain" and "Pain as Bad as it Could be" to indicate how severe your **other pain** is now.

No Pain \_\_\_\_\_ Pain as Bad as it Could be

9. \_\_\_\_\_

10. On the line below, mark one point between "No Pain" and "Pain as Bad as it Could be" to indicate how severe your **other pain** is usually (over the last two weeks).

No Pain \_\_\_\_\_ Pain as Bad as it Could be

10. \_\_\_\_\_

# FQ

11. On the line below, mark one point between "None" and "The Most Severe Imaginable" to indicate how **anxious** you feel about your **pain**.

None: \_\_\_\_\_ The Most Severe Imaginable

12. On the line below, mark one point between "None" and "The Most Severe Imaginable" to indicate how **angry** you feel about your **pain**.

None: \_\_\_\_\_ The Most Severe Imaginable

13. On the line below, mark one point between "None" and "The Most Severe Imaginable" to indicate how much **fear** you feel about your **pain**.

None: \_\_\_\_\_ The Most Severe Imaginable

14. On the line below, mark one point between "None" and "The Most Severe Imaginable" to indicate how **frustrated** you feel about your **pain**.

None: \_\_\_\_\_ The Most Severe Imaginable

15. On the line below, mark one point between "None" and "The Most Severe Imaginable" to indicate how much **depression** you feel about your **pain**.

None: \_\_\_\_\_ The Most Severe Imaginable

OFFICE USE

11. \_\_\_\_\_

12. \_\_\_\_\_

13. \_\_\_\_\_

14. \_\_\_\_\_

15. \_\_\_\_\_

16. Were you off work due to the accident?..... No ☐ 1

Yes ☐ 2

How many days have you been offwork so far? \_\_\_\_\_ days

If yes, are you still off work?.... No ☐ 1 Yes ☐ 2

17. If you are working, are you working reduced hours because of the accident?....

No ☐ 1 Yes ☐ 2

18. Have you hired a lawyer to help you with your claim?..... No ☐ 1 Yes ☐ 2

19. Are you taking medications to ease the pain?..... No ☐ 1 Yes ☐ 2

20. Have you taken beer, wine or liquor to ease the pain?..... No ☐ 1 Yes ☐ 2

## FQ

### Section C

Using the scale below, indicate the number which best describes how often you felt or behaved this way **DURING THE PAST WEEK.**

0 = Rarely or none of the time (less than 1 day)

1 = Some or a little of the time (1-2 days)

2 = Occasionally or a moderate amount of time (3-4 days)

3 = Most or all of the time (5-7 days)

**During the past week:**

- \_\_\_ 1. I was bothered by things that usually don't bother me.
  - \_\_\_ 2. I did not feel like eating; my appetite was poor.
  - \_\_\_ 3. I felt that I could not shake off the blues even with help from my family or friends.
  - \_\_\_ 4. I felt that I was just as good as other people.
  - \_\_\_ 5. I had trouble keeping my mind on what I was doing.
  - \_\_\_ 6. I felt depressed.
  - \_\_\_ 7. I felt that everything I did was an effort.
  - \_\_\_ 8. I felt hopeful about the future.
  - \_\_\_ 9. I thought my life had been a failure.
  - \_\_\_ 10. I felt fearful.
  - \_\_\_ 11. My sleep was restless.
  - \_\_\_ 12. I was happy.
  - \_\_\_ 13. I talked less than usual.
  - \_\_\_ 14. I felt lonely.
  - \_\_\_ 15. People were unfriendly.
  - \_\_\_ 16. I enjoyed life.
  - \_\_\_ 17. I had crying spells.
  - \_\_\_ 18. I felt sad.
  - \_\_\_ 19. I felt that people disliked me.
  - \_\_\_ 20. I could not get "going".
- 

### D. Smoking information

Do you smoke cigarettes? .....No ☐ 1 Yes ☐ 2

How many cigarettes do you smoke per day? \_\_\_\_\_ cigarettes.  
(Please give best estimate; one pack = 25 cigarettes)

**FQ**

**Section E**

<b>SF-36 HEALTH STATUS SURVEY/CANADA</b>
--

**INSTRUCTIONS:** This survey asks for your views about your health. This information will help keep track of how you feel and how well you are able to do your usual activities.

Answer every question by marking the answer as indicated. If you are unsure about how to answer a question, please give the best answer you can.

1. In general, would you say your health is:

(circle one)

- |                 |   |
|-----------------|---|
| Excellent ..... | 1 |
| Very good ..... | 2 |
| Good .....      | 3 |
| Fair .....      | 4 |
| Poor .....      | 5 |

2. Compared to one year ago, how would you rate your health in general now?

(circle one)

- |   |   |
|---|---|
| Much better now than one year ago .....     | 1 |
| Somewhat better now than one year ago ..... | 2 |
| About the same as one year ago .....        | 3 |
| Somewhat worse now than one year ago .....  | 4 |
| Much worse now than one year ago .....      | 5 |

## FQ

3. The following items are about activities you might do during a typical day. Does your health now limit you in these activities? If so, how much?

(circle one number on each line)

ACTIVITIES	Yes, Limited A Lot	Yes, Limited A Little	No, Not Limited At All
a. Vigorous activities, such as running, lifting heavy objects, participating in strenuous sports	1	2	3
b. Moderate activities, such as moving a table, pushing a vacuum cleaner, bowling, or playing golf	1	2	3
c. Lifting or carrying groceries	1	2	3
d. Climbing several flights of stairs	1	2	3
e. Climbing one flight of stairs	1	2	3
f. Bending, kneeling, or stooping	1	2	3
g. Walking more than a kilometre	1	2	3
h. Walking several blocks	1	2	3
i. Walking one block	1	2	3
j. Bathing or dressing yourself	1	2	3

4. During the past 4 weeks have you had any of the following problems with your work or other regular daily activities as a result of your physical health?

(circle one number on each line)

	YES	NO
a. Cut down the amount of time you spent on work or other activities.	1	2
b. Accomplished less than you would like	1	2
c. Were limited in the kind of work or other activities	1	2
d. Had difficulty performing the work or other activities (for example, it took extra effort)	1	2

5. During the past 4 weeks, have you had any of the following problems with your work or other regular daily activities as a result of any emotional problems (such as feeling depressed or anxious)?

(circle one number on each line)

	YES	NO
a. Cut down the amount of time you spent on work or other activities.	1	2
b. Accomplished less than you would like	1	2
c. Didn't do work or other activities as carefully as usual	1	2

## FQ

6. During the past 4 weeks, to what extent has your physical health or emotional problems interfered with your normal social activities with family, friends, neighbours, or groups?

(circle one)

Not at all .....	1
Slightly .....	2
Moderately .....	3
Quite a bit .....	4
Extremely .....	5

7. How much bodily pain have you had during the past 4 weeks?

(circle one)

None .....	1
Very mild .....	2
Mild .....	3
Moderate .....	4
Severe .....	5
Very severe .....	6

8. During the past 4 weeks, how much did pain interfere with your normal work (including both work outside the home and housework)?

(circle one)

Not at all .....	1
A little bit .....	2
Moderately .....	3
Quite a bit .....	4
Extremely .....	5



## FQ

9. These questions are about how you feel and how things have been with you during the past 4 weeks. For each question, please give the one answer that comes closest to the way you have been feeling. How much of the time during the past 4 weeks

(circle one number on each line)

	All of the Time	Most of the Time	A Good Bit of the Time	Some of the Time	A Little of the Time	None of the Time
a. Did you feel full of pep?	1	2	3	4	5	6
b. Have you been a very nervous person?	1	2	3	4	5	6
c. Have you felt so down in the dumps that nothing could cheer you up?	1	2	3	4	5	6
d. Have you felt calm and peaceful?	1	2	3	4	5	6
e. Did you have a lot of energy?	1	2	3	4	5	6
f. Have you felt downhearted and blue?	1	2	3	4	5	6
g. Did you feel worn out?	1	2	3	4	5	6
h. Have you been a happy person?	1	2	3	4	5	6
i. Did you feel tired?	1	2	3	4	5	6

## FQ

10. During the past 4 weeks, how much of the time has your physical health or emotional problems interfered with your social activities (like visiting with friends, relatives, etc.)?

(circle one)

- All of the time ..... 1
- Most of the time ..... 2
- Some of the time ..... 3
- A little of the time ..... 4
- None of the time ..... 5

11. How TRUE or FALSE is each of the following statements for you?

(circle one number on each line)

	Definitely True	Mostly True	Don't Know	Mostly False	Definitely False
a. I seem to get sick a little easier than other people	1	2	3	4	5
b. I am as healthy as anybody I know	1	2	3	4	5
c. I expect my health to get worse	1	2	3	4	5
d. My health is excellent	1	2	3	4	5

If you have pain as a result of the accident, please continue to answer the following sections (F & G). If you do not have pain, return this packet (including the unanswered sections) to us in the self-addressed stamped envelope.

Thank you for your participation.

# FQ

## Section F

The rating scales below are designed to measure the degree to which several aspects of your life are presently disrupted by chronic pain. In other words, we would like to know how much your pain is preventing you from doing what you would normally do, or from doing it as well as you normally would. Respond to each category by indicating the *overall* impact of pain in your life, not just when the pain is at its worst.

For each of the seven categories of life activity listed, **please circle the number on the scale** which describes the level of disability you typically experience. A score of 0 means no disability at all, and a score of 10 signifies that all of the activities in which you would normally be involved have been totally disrupted or prevented by your pain.

1. **Family/Home Responsibilities.** This category refers to activities related to the home or family. It includes chores and duties performed around the house (eg, yard work) and errands or favors for other family members (eg, driving the children to school).

0	1	2	3	4	5	6	7	8	9	10
										total
no disability										disability

2. **Recreation.** This category includes hobbies, sports, and other similar leisure time activities.

0	1	2	3	4	5	6	7	8	9	10
										total
no disability										disability

3. **Social Activity.** This category refers to activities which involve participation with friends and acquaintances other than family members. It includes parties, theater, concerts, dining out, and other social functions.

0	1	2	3	4	5	6	7	8	9	10
										total
no disability										disability

4. **Occupation.** This category refers to activities that are a part of or directly related to one's job. This includes nonpaying jobs as well, such as that of a housewife or volunteer worker.

0	1	2	3	4	5	6	7	8	9	10
										total
no disability										disability

5. **Sexual Behavior.** This category refers to the frequency and quality of one's sex life.

0	1	2	3	4	5	6	7	8	9	10
										total
no disability										disability

6. **Self Care.** This category includes activities which involve personal maintenance and independent daily living (eg, taking a shower, driving, getting dressed, etc).

0	1	2	3	4	5	6	7	8	9	10
										total
no disability										disability

7. **Life-Support Activity.** This category refers to basic life-supporting behaviors such as eating, sleeping, and breathing.

0	1	2	3	4	5	6	7	8	9	10
										total
no disability										disability

# FQ

## Section G

We would like to know how frequently you have the following thoughts or engage in the following behaviors only when your pain is at a **MODERATE** level of intensity or greater. Please indicate how frequently you do the following when experiencing pain by checking the appropriate box next to each statement.

Check ☐ 1 Never do when in pain.

Check ☐ 4 Frequently do when in pain.

Check ☐ 2 Rarely do when in pain.

Check ☐ 5 Very frequently do when in pain.

Check ☐ 3 Occasionally do when in pain.

- |   |                            |                            |                            |                            |                            |
|---|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|
| 1. Engaging in physical exercise or physical therapy ...  | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 | <input type="checkbox"/> 5 |
| 2. Saying to yourself, "I wish my doctor would prescribe better pain medication for me." .....                          | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 | <input type="checkbox"/> 5 |
| 3. Ignoring the pain (not even recognizing that it is there) .....  | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 | <input type="checkbox"/> 5 |
| 4. Staying busy or active .....   | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 | <input type="checkbox"/> 5 |
| 5. Clearing your mind of bothersome thoughts or worries .....   | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 | <input type="checkbox"/> 5 |
| 6. Thinking, "This pain is wearing me down." .....  | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 | <input type="checkbox"/> 5 |
| 7. Talking to others about how much your pain hurts ...   | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 | <input type="checkbox"/> 5 |
| 8. Reading .....  | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 | <input type="checkbox"/> 5 |
| 9. Praying for relief .....   | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 | <input type="checkbox"/> 5 |
| 10. Restricting or canceling your social activities .....   | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 | <input type="checkbox"/> 5 |
| 11. Depending on others for help with daily tasks .....   | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 | <input type="checkbox"/> 5 |
| 12. Participating in leisure activities (such as hobbies, sewing, stamp collecting, etc.) ....                          | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 | <input type="checkbox"/> 5 |
| 13. Thinking, "I can't do anything to lessen this pain." ...  | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 | <input type="checkbox"/> 5 |
| 14. Distracting your attention from the pain (recognizing you have pain, but putting your mind on something else) ..... | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 | <input type="checkbox"/> 5 |
| 15. Taking medication for purposes of immediate pain relief .....   | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 | <input type="checkbox"/> 5 |

## FQ

We would like to know how frequently you have the following thoughts or engage in the following behaviors only when your pain is at a **MODERATE** level of intensity or greater. Please indicate how frequently you do the following when experiencing pain by checking the appropriate box next to each statement.

Check ☐ 1 Never do when in pain.

Check ☐ 4 Frequently do when in pain.

Check ☐ 2 Rarely do when in pain.

Check ☐ 5 Very frequently do when in pain.

Check ☐ 3 Occasionally do when in pain.

16. Calling or seeing the doctor or nurse for  
help or advice ..... ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

17. Focusing on where the pain is and how much  
it hurts ..... ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

18. Keeping angry, depressed, or frustrated  
feelings inside ..... ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

**THANK YOU FOR YOUR PARTICIPATION**

## APPENDIX F



**UNIVERSITY ADVISORY COMMITTEE  
ON ETHICS IN HUMAN EXPERIMENTATION**

**(Behavioral Sciences)**

**NAME AND EC #:** J.D. Cassidy (P. Cote, L. Carroll, K. Yong-Hing)  
Department of Surgery (Orthopaedics)

**95-64**

**DATE:** March 31, 1995

The University Advisory Committee on Ethics in Human Experimentation (Behavioral Sciences) has reviewed your study "A Population-Based Survey of the Prevalence and Incidence of Neck and Low Back Pain in Saskatchewan" (95-64).

1. Your study has been APPROVED.
2. Any significant changes to your protocol should be reported to the Director of Research Services for Committee consideration in advance of its implementation.

*fs* Dr. C. von Basyer, Chair  
University Advisory Committee  
on Ethics in Human Experimentation, Behavioral Science



**UNIVERSITY ADVISORY COMMITTEE  
ON ETHICS IN HUMAN EXPERIMENTATION**

**(Behavioral Sciences)**

**NAME AND EC #:** Drs. Yong-Hing, Cassidy and Carroll  
Departments of Orthopaedics and Clincial Health Psychology

**94-68**

**DATE:** June 6, 1994

The University Advisory Committee on Ethics in Human Experimentation (Behavioral Sciences) has reviewed your study, "A Prespective, population-basedd study of acute whiplash injuries in Saskatchewan" (94-68).

1. Your study has been APPROVED.
2. Any significant changes to your protocol should be reported to the Director of Research Services for Committee consideration in advance of its implementation.

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for Dr. C. von Baeyer, Chair  
University Advisory Committee  
on Ethics in Human Experimentation, Behavioral Science

cc: Dr. C. von Baeyer